ST. ALOYSIUS COLLEGE(AUTONOMOUS), JABALPUR

Faculty of Science

Bachelor of Science (B.Sc.) V Semester
SUBJECT: COMPUTER SCIENCE
Paper-Core
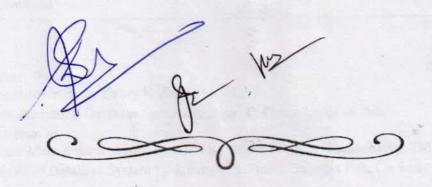### Relational Database Management System

CO. No.	Course Outcomes	Cognitive Level
CO 1	Understand database concepts, applications, structure, need for a database and ER-Model terminologies.	U, A
CO 2	Be able to understand the fundamentals of Relational Algebra and relational calculus	K,U
CO 3	To gain skills in creating a logical design of databases, including the E R method and normalization approach.	U
CO 4	Know about SQL functions and operators	U, A
CO 5	Understand the knowledge of Database and transaction management.	U

Credit and Marking Scheme

	Credits	Marks		Total Marks
		Internal	External	
Theory	4	40	60	100
Practical	2	40	60	100
Total	6		200	

Evaluation Scheme

	Marks	
	Internal	External
Theory	3 Internal Exams of 20 Marks (During the Semester) (Best 2 will be taken)	1 External Exams (At the End of the Semester)
Practical	3 Internal Exams (During the Semester) (Best 2 will be taken)	1 External Exams (At the End of the Semester)

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Reaccredited 'A+ 'Grade by NAAC(CGPA:3.68/4.00)
College with Potential for Excellence by UGC
DST-FIST Supported & STAR College Scheme by DBT

Bachelor of Science (B.Sc.)
V Semester

Subject: Computer Science
Paper: Core, Relational Database Management System

Content of the Course

No. of Lectures (in hours per week): 2 Hrs. per week

Total No. of Lectures: 60 Hrs.

Maximum Marks: 60

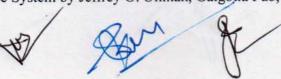| Units	Topics	No. of Lectures
I	Introduction: Advantages of the DBMS approach, various views of data, data independence, schema & sub-schema, Primary concepts of data models, Database languages, transaction management, database administrator, & uses, data dictionary, and overall system architecture. ER Model: Basic concepts, design issues, mapping constraints, keys, ER diagram, weak & strong entity sets, specialization & generalization, aggregation, inheritance, design of ER schema, reduction of ER schema to tables.	12
II	Domain Relation & Keys: Domains, relations, kinds of relation, relational databases, various types of keys, candidate, primary, alternate & foreign keys. Relation algebra & SQL: The structure, relation algebra with extended operations, modification of database, idea of relational calculus, basic structure of SQL, set operation, aggregate function.	12
III	Functional dependencies & Normalization: Base definition, trivial and nontrivial dependencies, closure set of dependencies, & of attributes, irreducible set of dependencies, introduction to normalization, non-loss decomposition, FD diagram, I,II & III NF, dependencies prevention, BCNF, multivalued dependencies, preventions, BCNF, Multivalued dependencies & 4NF, Join dependencies & 5NF.	12
IV	Introduction to SQL, Data types, key constraints:- primary key, Candidate key, Integrity rules Entity integrity, Referential integrity rule. SQL Commands: - DDL, DML, DCL, TCL syntax and examples, select query with all the clauses. Like Predicate, Operator (Between, In, Not in)	12
V	Advanced SQL: - SQL join operations, Sub queries, indexes, sequences, and views SQL Functions. Introduction to PL/SQL:-PL/SQL structure, Cursors, Triggers, Stored Procedures and functions. Transaction Management-concurrency & recovery, ACID properties, transaction state, implementation of atomicity and durability, Storage structure in database - types, hashing.	12

References

Text Books:
- Database concepts by Henry F. Korth, MGH
- An Introduction to Database System by Bipin C. Desai, Galgotia Pub.

Reference Books:
- Database Management system by Arun K. Majumdar & P. Bhattacharya, TMH Pub.
- Principles of Database System by Jeffrey O. Ullman, Galgotia Pub, Co. Ltd.

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List of Practical
Max Marks = 100 (60 External+40 Internal)

Sample Table – Worker

WORKER_ID	FIRST_NAME	LAST_NAME	SALARY	JOINING_DATE	DEPARTMENT

Sample Table – Bonus

WORKER_REF_ID	BONUS_DATE	BONUS_AMOUNT

Sample Table – Title

WORKER_REF_ID	WORKER_TITLE	AFFECTED_FROM

1. Write an SQL query to fetch "FIRST_NAME" from the Worker table using the alias name as <WORKER_NAME>.
2. Write an SQL query to fetch "FIRST_NAME" from the Worker table in upper case.
3. Write an SQL query to fetch unique values of DEPARTMENT from the Worker table.
4. Write an SQL query to print the first three characters of FIRST_NAME from the Worker table.
5. Write an SQL query to find the position of the alphabet ('a') in the first name column 'Amitabh' from the Worker table.
6. Write an SQL query to print the FIRST_NAME from the Worker table after removing white spaces from the right side.
7. Write an SQL query to print the DEPARTMENT from the Worker table after removing white spaces from the left side.
8. Write an SQL query that fetches the unique values of DEPARTMENT from the Worker table and prints its length.
9. Write an SQL query to print the FIRST_NAME from the Worker table after replacing 'a' with 'A'.
10. Write an SQL query to print the FIRST_NAME and LAST_NAME from the Worker table into a single column COMPLETE_NAME. A space char should separate them.
11. Write an SQL query to print all Worker details from the Worker table order by FIRST_NAME Ascending.
12. Write an SQL query to print all Worker details from the Worker table order by FIRST_NAME Ascending and DEPARTMENT Descending.
13. Write an SQL query to print details for Workers with the first names as "Vipul" and "Satish" from the Worker table.
14. Write an SQL query to print details of Workers with DEPARTMENT name as "Admin".
15. Write an SQL query to print details of the Workers whose FIRST_NAME contains 'a'.
16. Write an SQL query to print details of the Workers whose FIRST_NAME ends with 'a'.
17. Write an SQL query to print details of the Workers whose FIRST_NAME ends with 'h' and contains six alphabets.
18. Write an SQL query to print details of the Workers whose SALARY lies between 100000 and 500000.
19. Write an SQL query to print details of the Workers who joined in Feb'2014. Write an SQL query to fetch the count of employees working in the department 'Admin'.
20. Write an SQL query to fetch worker names with salaries >= 50000 and <= 100000.
21. Write an SQL query to fetch the no. of workers for each department in descending order.

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22. Write an SQL query to print details of the Workers who are also Managers.
23. Write an SQL query to fetch duplicate records having matching data in some fields of a table.
24. Write an SQL query to show only odd rows from a table.
25. Write an SQL query to show only even rows from a table.
26. Write an SQL query to clone a new table from another table.
27. Write an SQL query to fetch intersecting records of two tables.
28. Write an SQL query to show records from one table that another table does not have.