



Government Holkar (Model, Autonomous) Science  
College, Indore (M.P.)

Computer Science Department

Part A - Introduction			
Programme – B.C.A. (Computer Applications - Major)		Class – B.C.A. IV Semester	Year- 2025 Session- 2024-25
Course Type (Computer Applications) – Major			
1	Course Code	S4-BCA1T	
2	Course Title	Database Management Systems Using PL/SQL	
3	Pre – requisite (if any)	To study this course, a student must have the basic knowledge of Computers.	
4	Course Learning Outcomes (CLO)	<p>After the completion of this course, a successful student will be able to do the following:</p> <ol style="list-style-type: none"><li>1. Recall and describe the features of database management systems (DBMS) and relational databases.</li><li>2. Explain the principles behind designing conceptual database models using Entity-Relationship (ER) modeling and constructing queries using relational algebra.</li><li>3. Apply the knowledge to create and populate a Relational Database Management System (RDBMS) for real-life applications, incorporating constraints and keys using SQL.</li><li>4. Analyze existing database schemas, assess their design, and apply the principles of normalization to optimize the database structure.</li><li>5. Evaluate the efficiency and effectiveness of SQL queries in retrieving diverse types of information from a database.</li></ol>	
5	Credit Value	4 Credits	
6	Total Marks	Formative Assessment (CCE) – 40 Marks Summative Assessment (End Semester Exam) – 60 Marks Total 40+60= 100 Marks	Minimum Pass Marks – 35

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Part A - Introduction			
Programme – B.C.A. (Computer Applications - Major)	Class – B.C.A.IV Semester	Year- 2025	Session- 2024-25
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Course Code	S4-BCA1T		
Course Title	Database Management Systems Using PL/SQL		

Part – B Content of the Course		
Total no. of lectures – As per UGC rules (1 Credit = 15 Lectures)		
S. No.	Topics	No. of Lectures
I	Introduction to DBMS: Why database? Characteristics of data in database, DBMS. What are database advantages of DBMS? Database Architecture and Modelling: Conceptual, physical and logical database models, Role of DBA, Database design. Entity Relationship (ER) Model: Components of ER-model, ER modelling symbols, Relationships. Enhanced Entity Relationship (EER) Model: An introduction, Super class and subclass entity types, Specialization, Generalization, Attribute inheritance, Categorization & aggregation.	12
II	The Relational Data Model: Fundamental Concepts: Relations, Null Values, Keys, Foreign Key, Integrity Constraints - Entity Integrity & Relational Integrity. Normalization Process: First Normal Form, Functional Dependencies, Second Normal Form, Third Normal Form, Boyce-Codd Normal Form (BCNF), Fourth Normal Form; Other Normal Forms - Fifth Normal Form & Domain/Key Normal Form. Transforming a Conceptual Model to a Relational Model: Transforming Objects Sets and Attributes, Transforming Models without External Keys, Transforming Specialization and Generalization Object Sets, Transforming Relationships: One-One Relationships, One-Many Relationships, Many-Many Relationships; Transforming Aggregated Object Sets, Transforming Recursive Relationships.	12

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III	<p>Relational database implementation:</p> <p>(a) Relational Algebra and Calculus:</p> <p>Relational Algebra: Union, Intersection, Difference, Product, Select, Project, Join - Natural, Theta &amp; Outer Join, Divide, Assignment.</p> <p>Relational Calculus: Target list &amp; Qualifying Statement, The Existential Quantifies, The Universal Quantifier.</p>	12
IV	<p>Relational database implementation (continued):</p> <p>(b) Relational Implementation with SQL</p> <p>Relational Implementations: An Overview. Schema and Table Definition: Schema definition, Data types &amp; domains, Defining Tables, Column Definition.</p> <p>Data Manipulation: Simple Queries (SELECT, FROM, WHERE), Multiple-Table Queries, Sub-queries, Correlated Sub-queries, EXISTS and NOT EXISTS operators, Built-in Functions (SUM, AVG, COUNT, MAX, and MIN), GROUP BY and HAVING clause, Built-In Functions with Sub-queries.</p> <p>Relational Algebra Operations: UNION, INTERSECT, EXCEPT, JOIN.</p> <p>Database Change Operations: INSERT, UPDATE, DELETE. Using SQL with Data Processing Languages; View Definition, Restrictions on View Queries and Updates.</p>	12
V	<p>Physical Database Systems: Introduction, Physical Access of the Database, Physical Storage Media, Secondary Storage, Physical Storage Blocks.</p> <p>Disk Performance Factors: Access Motion Time, Head Activation Time, Rotational Delay, Data Transfer Rate, Data Transfer Time.</p> <p>Data Storage Format on Disk: Track Format, Record Format : Fixed-Length Records &amp; Variable- Length Records, Input/ Output Management.</p> <p>File Organizing and Addressing Methods: Sequential File Organization, Indexed Sequential File Organization, Direct File Organization, Hashing: Static Hash Functions and Dynamic Hash Functions.</p>	12



Part A - Introduction			
Programme – B.C.A. (Computer Applications - Major)	Class – B.C.A. IV Semester	Year- 2025	Session- 2024-25
Course Type (Computer Applications) – Major			
Course Code	S4-BCAIT		
Course Title	Database Management Systems Using PL/SQL		

Part – C Learning Resources
Text Books, Reference Books, Other Resources
<p><b>Suggested Readings:</b></p> <p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1. Gary W. Hansen &amp; James V. Hansen, "Database Management and Design", 2<sup>nd</sup> Ed., 2007, Prentice Hall of India Pvt Ltd.</li> <li>2. Instructional Software Research &amp; Development (ISRD) Group, Lucknow "Introduction to Database Management Systems", 2006, Ace Series, Tata McGraw Hill Publishing Company Limited, New Delhi.</li> <li>3. Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", 7th Edition, 2016, Pearson.</li> </ol> <p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. Raghu Ramakrishnan &amp; Johannes Gehrke, "Database Management Systems", 3<sup>rd</sup> Edition, 2014, McGraw Hill Education</li> <li>2. C.J. Date, "An Introduction to Database System", 8<sup>th</sup> Edition, 2003, Pearson</li> <li>3. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", 6<sup>th</sup> Edition, 2010, Tata McGraw Hill</li> <li>4. Books published by M.P. Hindi Granth Academy, Bhopal</li> </ol> <p><b>Suggested Digital Platforms Web Links:</b></p> <ol style="list-style-type: none"> <li>1. <a href="http://en.wikipedia.org/wiki/Relationalmodel">http://en.wikipedia.org/wiki/Relationalmodel</a></li> <li>2. <a href="http://en.wikipedia.org/wiki/Relationalalgebracs.nYu.edu/courses/Fall_12/CSCI-GA.2400-001/lecture4.pdf">http://en.wikipedia.org/wiki/Relationalalgebracs.nYu.edu/courses/Fall_12/CSCI-GA.2400-001/lecture4.pdf</a></li> <li>3. <a href="http://www.w3schools.in/dbms/database-normalization/">http://www.w3schools.in/dbms/database-normalization/</a></li> <li>4. <a href="https://beginnerbook.com/2015/05/normalization-in-dbms/">https://beginnerbook.com/2015/05/normalization-in-dbms/</a></li> <li>5. <a href="https://ecomputernotes.com/fundamentall/what-is-a-database/functional-dependence">https://ecomputernotes.com/fundamentall/what-is-a-database/functional-dependence</a></li> <li>6. <a href="http://www.mphindigranthacademy.org/">http://www.mphindigranthacademy.org/</a></li> </ol> <p><b>Suggested Equivalent Online Courses:</b></p> <ol style="list-style-type: none"> <li>1. <a href="https://archive.nptel.ac.in/courses/106/106/106106220/">https://archive.nptel.ac.in/courses/106/106/106106220/</a></li> </ol>

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Course Code	S4-BCA1T		
Course Title	Database Management Systems Using PL/SQL		

Part – D Assessment and Evaluation				
<b>Internal Assessment: Continuous Comprehensive Evaluation (CCE)/ Formative Assessment: 40 Marks</b>  Formative Assessment shall be based on – Quiz, Seminar, Presentation, Written test, Case Study, Project, Assignment etc.  The division of marks is as follows:			<b>External Evaluation (Summative Assessment):</b> <b>End Semester Exam: 60 Marks</b> Time: 03 hours	
Test I	20 Marks	Best two test Marks = (20 + 20)	Section (A): 5 Objective Questions (1 mark each)	5 x 1 = 5
Test II	20 Marks		Section (B): 5 Short Questions out of eight questions (200 words each) (7 Marks each)	5 x 7 = 35
Test III	20 Marks		Section (C): Two long questions out of four questions ( 500 Words each) (10 Marks each)	2 x 10 = 20
Total Internal Assessment (CCE) Marks		40 Marks	Total External Evaluation (Theory) Marks (A+B+ C)	60 Marks
Note:	1.	For Major, Minor, Open Elective, Foundation and Vocational Courses, Part D will be as per the scheme of marks given.		
	2.	The student should secure 35% marks in Internal Assessment (CCE) and External Evaluation (theory) combined.		

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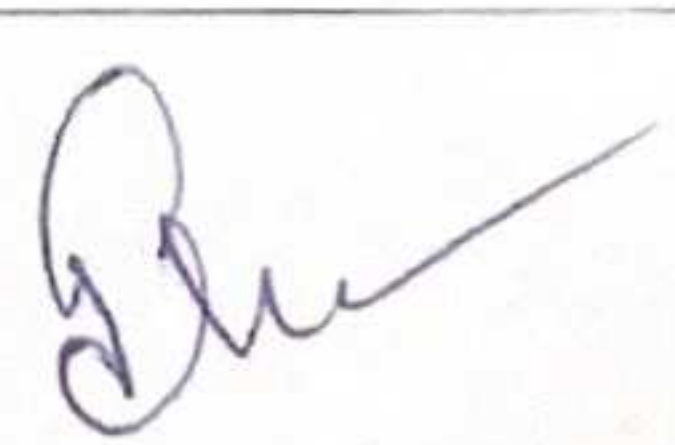
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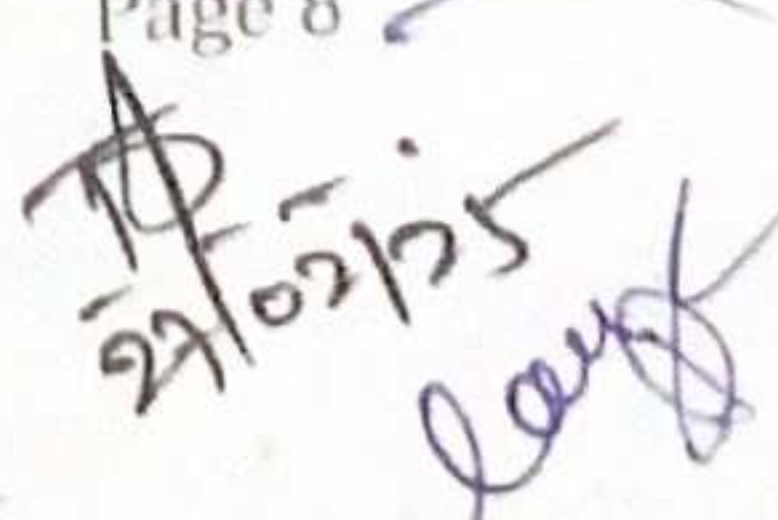
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Part A- Introduction (Practical)			
Programme – B.C.A. (Computer Applications - Major)		Class – B.C.A. IV Semester	Year- 2025 Session- 2024-25
Course Type (Computer Applications) – Major			
1.	Course Code	S4-BCAITP	
2.	Course Title	Database Management Systems Lab	
3.	Pre-requisite (if any)	To study this course, a student must have the basic knowledge of Computers.	
4.	Course Learning Outcomes (CLO)	<p>After completing this lab course sessions, student will be able:</p> <ol style="list-style-type: none"><li>1. Implement relational databases using database management systems (DBMS) for real-world applications, demonstrating practical skills in database creation.</li><li>2. Demonstrate proficiency in constructing, executing, and optimizing SQL queries to manipulate and retrieve data within a practical database environment.</li><li>3. Analyze and enhance database query performance and structural efficiency by applying indexing and normalization techniques.</li><li>4. Apply database security measures, including access control, to ensure data integrity and confidentiality in a practical database context.</li><li>5. Synthesize acquired knowledge and skills to design, implement, and optimize a practical database system, reflecting real-world applications and problem-solving.</li></ol>	
5.	Credit Value	2 Credits	
6	Total Marks	Formative Assessment (CCE) – 40 Marks Summative Assessment (End Semester Exam) – 60 Marks Total 40+60= 100 Marks	Minimum Pass Marks – 35



Part B- Content of the Course	
Total no. of lectures – As per UGC rules: 30	
Suggestive List of Practicals	
1.	To draw ER Model and Relational Model for a given database. Show ER to Relational Model reduction.
2.	Implementation Database: Creation of Database with proper constraints (Primary Key, Foreign Key) Insert into database using different types of insert statements. Display
3.	Data Definition (schema) Modification 1. Alter table: add column, remove column, add constraint, remove constraint. 2. Drop table. 3. Show schema of any table 4. Applying different constraints check, not null, etc.
4.	Simple SQL queries (Single table retrieval) 5. Make use of different operators (relational, logical etc.) 6. Selection of rows and columns, renaming columns, use of distinct keyword, String handling (% , etc.) 7. Update statement, case update 8. Delete, cascade delete (if possible)
5.	Advanced SQL Queries-1 1. Group by, having clause, aggregate function 2. Set operations like union, union all and use of order by clause 3. Nested queries: in, not in, exists, not exists and any, all
6.	Advanced SQL Queries -2 1. Join (Inner & Outer) 2. Exists & Union
7.	Implementation of views. 1. Creation of views 2. Usage of views 3. Creation of views using views 4. Drop views

  
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## Part – C Learning Resources

### Text Books, Reference Books, Other Resources

#### Suggested Readings:

##### Text Books:

1. Gary W. Hansen & James V. Hansen, "Database Management and Design", 2<sup>nd</sup> Ed., 2007, Prentice Hall of India Pvt Ltd.
2. Instructional Software Research & Development (ISRD) Group, Lucknow "Introduction to Database Management Systems", 2006, Ace Series, Tata McGraw Hill Publishing Company Limited, New Delhi.
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##### Reference Books:

1. Raghu Ramakrishnan & Johannes Gehrke, "Database Management Systems", 3<sup>rd</sup> Edition, 2014, McGraw Hill Education
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4. Books published by M.P. Hindi Granth Academy, Bhopal

##### Suggested Digital Platforms Web Links:

1. <http://en.wikipedia.org/wiki/Relationalmodel>
2. [http://en.wikipedia.org/wiki/Relationalalgebracs.nYu.edu/courses/Fall\\_12/CSCI-GA.2400-001/lecture4.pdf](http://en.wikipedia.org/wiki/Relationalalgebracs.nYu.edu/courses/Fall_12/CSCI-GA.2400-001/lecture4.pdf)
3. <http://www.w3schools.in/dbms/database-normalization/>
4. <https://beginnerbook.com/2015/05/normalization-in-dbms/>
5. <https://ecomputernotes.com/fundamentall/what-is-a-database/functional-dependence>
6. <http://www.mphindigranthacademy.org/>


##### Suggested Equivalent Online Courses:


1. <https://archive.nptel.ac.in/courses/106/106/106106220/>

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Part D- Assessment and Evaluation	
Suggested Continuous Evaluation methods:	
Internal Assessment/Formative Examination(A):	40 Marks
Lab Record	15 Marks
Attendance in the Lab	05 Marks
Assignments (It can be in different modes)	20 Marks
End Semester External Evaluation (B):	60 Marks
Viva Voce on Practical	10 Marks
Practical Record File	10 Marks
Experiments	40 Marks
Total Marks (A+B)	(40 + 60 =100 Marks)

  
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