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Database Management System — Complete Syllabus

BTEUP Diploma in Computer Science & Engineering • 3rd Semester • Session 2026-27
Subject 3.2 (Theory) + 3.6 (Lab) • Total 200 Marks • 5 Credits

Examination Scheme

Code	Paper	Type	L - P	Credits	Internal	External	Total
3.2	Database Management System	Theory	3 - 0	3	Theory 40	Theory 60 (3 hrs)	100
3.6	Database Management System (Lab)	Practical	0 - 4	2	Practical 60	Practical 40 (3 hrs)	100
DBMS Total				5	100	100	200

What This Subject Aims To Do

To cover the development of database-driven applications using modern database management software — including conceptual modelling, relational database design and database query languages. By the end you should be able to: describe DBMS fundamentals, installation and working; understand keys and data models; understand the relational model and relational algebra; design a relational database; and apply SQL commands to create, insert, retrieve, update and delete data.

Unit-Wise Complete Topic List

Unit	Topic	Periods	Marks Share
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1	Introduction	6	10%
2	Data Model and Keys	8	25%
3	Relational Model	10	25%
4	Relational Database Design	10	25%
5	SQL / MySQL	8	15%

Unit 1 — Introduction (6 Periods, 10%)

Topics: Database system concepts and architecture; components of DBMS; table structure; schema definition; three views of data (external view, conceptual view, internal view).

In simple words: What a database system is, what parts it has, and the three ways of looking at the same data — what the user sees, how it is designed, and how it is actually stored.

Unit 2 — Data Model and Keys (8 Periods, 25%)

Topics: Data model definition; network model, hierarchical model, E-R model; advantages and disadvantages of each data model; concept of keys (primary, candidate, super, foreign); constraints; strong entity set and weak entity set.

In simple words: Different ways to model data, how tables are linked through keys, and the rules (constraints) that keep data correct.

Unit 3 — Relational Model (10 Periods, 25%)

Topics: The relational data model and relational database constraints; ER/EER to relational model mapping; relational algebra and relational calculus; basic operations (union, intersection, difference, Cartesian product); additional operations (projection, selection, division, rename, join).

In simple words: The maths behind tables: how to combine, filter and join tables to get exactly the data you want — this is the theory behind every SQL query.

Unit 4 — Relational Database Design (10 Periods, 25%)

Topics: Functional dependencies and normalisation for relational databases; types of normalisation (1NF, 2NF, 3NF, multivalued dependencies and BCNF, fourth normal form, fifth normal form).

In simple words: How to design tables so data is not repeated unnecessarily and cannot become inconsistent — the rules that turn a messy table into a clean database.

Unit 5 — SQL / MySQL (8 Periods, 15%)

Topics: MySQL data types; data definition commands; data manipulation commands; data retrieval commands; types of operators — arithmetic, comparison and logical operators.

In simple words: The actual SQL language: creating tables, inserting and changing data, and asking questions of the database.

Practical Work

- Install and configure a database system (MySQL through XAMPP Server, MySQL, PostgreSQL, or SQLite).
- Design an ER model for a Library Management System.
- Study the different properties present in an ER model.
- Creating a database and a table; specifying relational data types, constraints and indexes.
- Table and record handling: INSERT, SELECT with INSERT, DELETE, UPDATE, TRUNCATE, DROP and ALTER statements.
- Retrieving data: SELECT, WHERE clause, logical operators, IN, BETWEEN, LIKE, ORDER BY, GROUP BY and HAVING clauses, aggregate functions, and combining tables using JOINS.
- Case study 1: SQL — Library Management System (books, members, authors, publishers).
- Case study 2: SQL — Employee Database (department, salary, joining date queries).
- Case study 3: SQL — Bookstore Inventory (genre, price and stock queries).
- Case study 4: SQL — Student Grades Database (grade-wise retrieval, averages, updates and deletions).

Reference Books (as listed in the syllabus)

- Fundamentals of Database Systems — Elmasri & Navathe, Pearson Education
- Database Management Systems — Raghu Ramakrishnan & Johannes Gehrke, Tata McGraw-Hill
- Database System Concepts — Silberschatz, Korth & Sudarshan, McGraw-Hill
- Introduction to Database Systems — C. J. Date, Pearson Education
- Introduction to SQL — Rick F. van der Lans, Pearson Education

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Source: BTEUP 2nd Year curriculum (folder2627), approved in C.D.C. meeting held on 16.07.2026. Topic lists follow the official syllabus; short explanations are the author's own plain-English summaries, not syllabus text.

Please confirm with your own polytechnic for any local changes.