



Faculty of: **Computer Science**

Course: **Bachelor of Science Information Technology**

Semester: **II**

Subject Code: **ITM203-1C**

Subject Name: **DATABASE MANAGEMENT SYSTEM**

| Sr. No | Category  | Subject Code | Subject Name               | Teaching hours/ Week |    |    | Credit hours | Credit Points | Evaluation Scheme/ Semester             |            |                    |          |                     |          |                    |          | Total |
|--------|-----------|--------------|----------------------------|----------------------|----|----|--------------|---------------|---|------------|--------------------|----------|---------------------|----------|--------------------|----------|-------|
|        |           |              |                            | Th                   | Tu | Pr |              |               | Theory                                  |            |                    |          | Practical           |          |                    |          |       |
|        |           |              |                            |                      |    |    |              |               | Continuous and Comprehensive Evaluation |            | End Semester Exams |          | Internal Assessment |          | End Semester Exams |          |       |
|        |           |              |                            |                      |    |    |              |               | Marks                                   | Marks      | Marks              | Duration | Marks               | Duration | Marks              | Duration |       |
| 1      | MAJOR-III | ITM203-1C    | DATABASE MANAGEMENT SYSTEM | 3                    | -- | 2  | 5            | 4             | 10                                      | Assignment | 50                 | 2        | 25                  | 1        | -                  | -        | 100   |

**AIM:** The aim of this subject is to make student how to use these concepts in database applications. The students would be able to decide where and how to store and retrieve the information effectively using advanced concept of database, recognize the elements of Database for real life applications and familiar with the advanced database concepts such as distributed database.

**COURSE CONTENTS**

**Unit -1 : Introduction to Database (06 Lectures)**

- [a] Introduction to Database Systems. RDBMS
- [c] Dr. E. F. Codd’s Rules
- [d] Normalization and Types of Normalization.
- [e] E-R Modeling Concept and Diagrams.

**Unit -2 : SQL (15 Lectures)**

- [a] Data types of SQL
- [b] Data Definition commands with constraints
- [c] Advanced data definition commands
  - Changing Column’s Data Type
  - Changing Column’s Data Characteristics
  - Adding a new column, Dropping an existing column
- [d] Data manipulation commands with adding, deleting, updating rows/content in tables
- [e] Select Statement with WHERE, DISTINCT, ORDER BY, GROUP by, HAVING clause
- [f] Constraint – primary key, not null, check, unique, referential integrity
- [g] Arithmetic operators, Logical operators, Special Operators – IN, NOT IN, ANY, BETWEEN, ALL, LIKE, EXISTS

**Unit -3 : Joins and Sub queries (12 Lectures)**

- [a] Aggregate Functions (sum, average, count, min, max)
- [b] String handling functions (chr, concat, initcap, lower, lpad, ltrim, replace,

substr)

[c] Set Operators (Union, Union all, intersect, minus)

[d] Introduction and types of Joins

- Natural Join or Equi Join
- Outer Join
- Right Outer Join, Left Outer Join, Full Outer Join, Self-Join, Cross Join

[e] Introduction to Sub queries.

- Single Row Sub queries ,
- Multiple Value Sub queries
- Multiple Column Sub queries, Multiple Row Sub queries

[f] Transaction Control Language Commands.

[g] Creating users, Data Control Language Commands.

#### **Unit -4 : OLTP Environment**

**(06 Lectures)**

[a] OLTP Environments.

[b] Concurrency issues.

[c] Need for transactions and necessary properties for transactions (ACID)

[d] Transaction states

[e] Concurrency states, Concurrency control ((Serialized and non-serialized schedules)

#### **Unit -5 : DDBMS**

**(06 Lectures)**

[a] Introduction and evolution of DDBMS.

[b] Distributed Processing and Distributed Database

[c] DDBMS Advantages and Disadvantages.

[d] Characteristics of DDBMS, Components of DDBMS

#### **Arrangement of lectures duration and practical session as per defined credit numbers:**

| Units        | Lecture Duration<br>(In Hrs.) |           | Calculation of Credits<br>(In Numbers) |           | Total<br>Lecture<br>Duration | Credit<br>Calculation |
|--------------|-------------------------------|-----------|--|-----------|------------------------------|-----------------------|
|              | Theory                        | Practical | Theory                                 | Practical | Theory +<br>Practical        | Theory +<br>Practical |
| Unit -1      | 06                            | 02        | 3                                      | 1         | 08                           | 4                     |
| Unit -2      | 15                            | 15        |  |           | 30                           |                       |
| Unit -3      | 12                            | 13        |  |           | 25                           |                       |
| Unit -4      | 06                            | 00        |  |           | 06                           |                       |
| Unit -5      | 06                            | 00        |  |           | 06                           |                       |
| <b>Total</b> | <b>45</b>                     | <b>30</b> | <b>3</b>                               | <b>1</b>  | <b>75</b>                    | <b>4</b>              |

#### **Evaluation:**

| Theory Marks | Practical Marks | Total Marks |
|--------------|-----------------|-------------|
| <b>75</b>    | <b>25</b>       | <b>100</b>  |

#### **REFERENCE BOOKS:**

- RDBMS Using Oracle – Bharat & Co. [ISBN No. : 978-93-81786-38-3]
- SQL, PL/SQL The programming - Lang.Of Oracle Ivan Bayross - BPB [ISBN No. : 81-7656-964-X]

#### **NPTEL COURSE (<https://nptel.ac.in/>):**

Fundamentals of Database Systems by Dr. Arnab Bhattacharya

Course Link: <https://nptel.ac.in/courses/106104135>