

As Per NEP 2020

University of Mumbai



Syllabus for Basket of OE	
Board of Studies in Data Science	
UG First Year Programme	
Semester	I
Title of Paper	Credits 2/ 4
I. DS_Database Management System (Open Elective)[OE]	2
II.	
From the Academic Year	2024-2025

Name of the Course: DS Database Management System

Sr.No.	Heading	Particulars
1	Description the course:	• Introduction: A Database Management System (DBMS) is a software that manages databases. It provides an interface for interacting with the database, ensures data integrity, and supports efficient and secure data retrieval and storage. • Relevance and Usefulness: DBMS is widely used in business applications to store and manage large volumes of data related to customers, transactions, products, and more. DBMS allows for efficient data retrieval and manipulation, improving overall system performance. • Applications: The versatility of DBMS makes it a fundamental component in numerous applications, contributing to the efficient management and utilization of data across various industries. • Interest and Connection with Other Courses: Prerequisite: Basic Computer knowledge of computer architecture, storage, operating system. It also good to know about basic programming knowledge. Understanding DBMS principles and practices can enhance the effectiveness of professionals in various fields by providing them with the skills to manage and utilize data efficiently. • Demand in the Industry: Database Management System course aims to gain the knowledge of DBMS concept, principle, and design. Database is a collection of interrelated data, and this data can be managed, access, manipulate and organise data in system with the help of software. It benefits to user by providing data access, reduced redundancy, data integrity, data sharing, data organizing, data consistency, data accuracy, and security • Job Prospects: The job prospects in DBMS are diverse, and professionals with expertise in this field are sought after in nearly every industry where data plays a crucial role in decision-making and operations. As technology continues to evolve, the demand for skilled DBMS professionals is likely to remain strong.
2	Vertical :	Open Elective
3	Type :	Theory
4	Credits :	2 credits (30 Hours in a semester)
5	Hours Allotted :	30 Hours
6	Marks Allotted:	50 Marks
7	Course Objectives(CO):	

	CO 1. To understand concept of database by organizing, structuring and storing data. CO 2. To understand data models and entity relationship. CO 3. To understand retrieve data and concept of redundancy CO 4. To specify the data requirement in database applications CO 5. To create, manipulate queries in database.	
8	Course Outcomes (OC): OC 1. Students should be able to use the concept of database and it's important in software development. OC 2. Students should be able to design database and draw logical structure using Entity relationship. OC 3. Students should be able to construct normalized database and functional dependencies. OC 4. Students should be able to design the database schema with the appropriate data types. OC 5. Students should be able to create, manipulate the database management system to evaluate the business information problem.	
9	Modules: Module 1:	
	1. Introduction & DBMS Architecture: What is Database? Need of database, Role and Advantages of the DBMS, Types of Databases, Data Processing, Database Systems 2. Data Models: Data Modelling and Data Models, The Importance of Data Models, Data Model Basic Building Blocks, Business Rules, Degrees of Data Abstraction 3. Entity Relationship Model and Unified Modelling Language: Relationships, Connectivity and Cardinality, Existence Dependence, Relationship Strength, Weak Entities, Relationship Degree, Recursive Relationships, Associative (Composite) Entities, Developing an ER Diagram. 4. Advanced Data Modelling: The Extended Entity Relationship Model, Entity Clustering, Entity Integrity: Primary Keys, Design Cases: Learning Flexible Database Design.	15 Hrs
	Module 2:	
	1. Normalization of Database Tables: Database Tables and Normalization, The Normalization Process, Surrogate Key Considerations, Higher-Level Normal Forms, Normalization and Database Design, Denormalization, Data-modelling Checklist. 2. Database Design: The Information System, The Systems Development Life Cycle, The Database Life Cycle, Conceptual Design, DBMS Software Selection, Logical Design, Physical Design, Database Design Strategies, Centralized versus Decentralized Design 3. Transaction Management and Concurrency Control: What Is a Transaction? Concurrency Control with Locking Methods,	15 Hrs

	Concurrency Control with Time Stamping Methods, Concurrency Control with Optimistic Methods, ANSI Levels of Transaction Isolation, Database Recovery Management Database Performance Tuning and Query Optimization: Database Performance-Tuning Concepts, Query Processing, Indexes and Query Optimization, Optimizer Choices, SQL Performance Tuning, Query Formulation, DBMS Performance Tuning. 4. Database Administration and Security: Data as a Corporate Asset, The Need for a Database and Its Role in an Organization, Special Considerations, Security, Database Administration Tools, Data Administration Strategy, The DBA's Role in the Cloud, The DBA at Work: Using Oracle for Database Administration	
10, 11	Reference and Text Books 1. Fundamentals of Database Systems, Elmasri Ramez and Navathe Shamkant B, Pearson Education 6th Edition, 2010. 2. Database System Concepts Silberschatz, Korth, Sudarshan, McGraw Hill, 5 Edition, 2006. 3. Database Management Systems, Ramakrishna, Gehrke, McGraw- Hill, 2007 4. Murach's MySQL Joel Murach, Murach, 2012.	
12	Internal Continuous Assessment: 40%	Semester End Examination: 60%
13	Continuous Evaluation through: Class test of 1 of 15 marks Class test of 2 of 15 marks Average of the two: 15 marks Quizzes/ Presentations/ Assignments: 5 marks Total: 20 marks	Format of Question Paper: External Examination (30 Marks)– 1 hr duration
14	Format of Question Paper: (Semester End Examination : 30 Marks. Duration:1 hour) Q1: Attempt any two (out of four) from Module 1 (15 marks) Q2: Attempt any two (out of four) from Module 2 (15 marks)	

Sign of Chairperson
Dr. Mrs. R. Srivaramangai
Ad-hoc BoS (Data Science)

Sign of the
Offg. Associate Dean
Dr. Madhav R. Rajwade
Faculty of Science & Technology

Sign of Offg. Dean,
Prof. Shivram S. Garje
Faculty of Science & Technology