



# **SNS COLLEGE OF ENGINEERING**

Kurumbapalayam (Po), Coimbatore – 641 107

**An Autonomous Institution**

Accredited by NBA – AICTE and Accredited by NAAC – UGC with ‘A’ Grade  
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING(IoT and  
Cybersecurity Including BCT)**

**COURSE NAME : 19SB504 DATABASE MANAGEMENT SYSTEMS**

**III YEAR / V SEMESTER**

**Unit III-E-R Diagram models and NORMAL FORMS**

**Topic :Database Design Process**



# UNIT III ER DIAGRAM MODELS AND NORMAL FORMS

DATABASE DESIGN: Database Design Process, ER Diagrams - Entities, Attributes, Relationships, Constraints, keys, extended ER features, Generalization, Specialization, Aggregation, Conceptual design with the E-R model. E-R Issues- weak entity set, code rules, Dependencies and Normal forms - Functional Dependencies, Normalizations: 1NF,2NF,3NF,BCNF,4NF,5NF.



# Database Design Process

- ✓ The database design process is a critical step in developing a database system that efficiently and accurately stores and retrieves data.
- ✓ It involves several stages and best practices to ensure the database meets the requirements of the organization and can evolve as those requirements change.
- ✓ Here is an overview of the typical steps involved in the database design process:



# Database Design Process



## Requirements Analysis:

- ✓ Understand the organization's data requirements and objectives.
- ✓ Identify the data to be stored, processed, and retrieved.
- ✓ Interview stakeholders to gather requirements and understand the business processes.



# Database Design Process

## Conceptual Database Design:

- ✓ Create an abstract representation of the database, often using Entity-Relationship Diagrams (ERD).
- ✓ Define entities, attributes, and relationships between data entities.
- ✓ Identify primary keys and unique identifiers.



# Database Design Process

## Logical Database Design:

- ✓ Transform the conceptual model into a logical model.
- ✓ Define data structures, tables, and constraints (e.g., foreign keys, unique constraints).
- ✓ Normalize the data to eliminate data redundancy and ensure data integrity.



# Database Design Process

## Schema Design:

- ✓ Choose an appropriate database management system (DBMS) that suits the project requirements.
- ✓ Design the database schema in the chosen DBMS.
- ✓ Define data types, indexes, and constraints specific to the DBMS.

## Normalization:

- ✓ Apply normalization techniques to reduce data redundancy and improve data integrity.
- ✓ Ensure that each table has a clear, specific purpose.



# Database Design Process

## Physical Database Design:

- ✓ Define storage structures and access paths, including file organization and indexing.
- ✓ Consider performance optimization, such as denormalization for frequently queried data.
- ✓ Plan for data security and access control.





# Database Design Process

## Data Modeling Tools:

- ✓ Utilize data modeling tools and software (e.g., ERD tools like Lucidchart, ERwin, or MySQL Workbench) to help with the design and documentation.

## Implementation:

- ✓ Create the physical database using SQL or a database design tool.
- ✓ Write scripts to define tables, relationships, indexes, and constraints.
- ✓ Populate the database with initial data.



# Database Design Process

## **Testing and Quality Assurance:**

Perform extensive testing to ensure the database functions correctly.

Verify data integrity, security, and performance.

Refine and adjust the design based on testing results.

## **Data Migration:**

If transitioning from an existing system, plan and execute data migration processes to transfer existing data to the new database.



# Thank You.....