| | |
|---|---|
| **COURSE CODE** | **GIE-321** |
| **COURSE NAME** | **DATABASE MANAGEMENT SYSTEMS** |
| **CREDIT HOURS** | Theory: 02 |
| | Practical: 01 |
| | Total: 03 |
| **CONTACT HOURS** | Theory: 32 |
| | Practical: 48 |
| | Total: 80 |
| **PREREQUISITE** | None (It is a Pre-requisite course for GIE-409 Spatial DBs) |

**MODE OF TEACHING:**

| | | |
|---|---|---|
| Instruction: | Two hours of lecture per week | 67% |
| Practical: | Three hours of Lab work per week | 33% |

**COURSE DESCRIPTION**:

Students are expected to have an in depth understanding of database concepts. The students will be able to design and implement a database management system using any relational database management system.

**COURSE OBJECTIVES:**

This course is aimed at providing the students with the background to design, implement, and use database management systems. Course gives both theoretical and practical knowledge of relational databases.

**RELEVANT PROGRAM LEARNING OUTCOMES (PLOs):**

The course is designed so that students will achieve the PLOs:

| | | | | | |
|---|---|---|---|---|---|
| 1 | Engineering Knowledge: | ☐ | 7 | Environment and Sustainability: | ☐ |
| 2 | Problem Analysis: | ☐ | 8 | Ethics: | ☐ |
| 3 | Design/Development of Solutions: | ☑ | 9 | Individual and Team Work: | ☐ |

| 4 | Investigation: | ☑ | 10 | Communication: | ☐ |
| 5 | Modern Tool Usage: | ☑ | 11 | Project Management: | ☐ |
| 6 | The Engineer and Society: | ☐ | 12 | Lifelong Learning: | ☐ |

## COURSE LEARNING OUTCOMES:

Upon successful completion of the course, students will be able to:

| No. | CLO | Domain | Taxonomy Level | PLO |
|---|---|---|---|---|
| 1 | Model relational schema using the entity relationship diagram. | Cognitive | 3 | 2 |
| 2 | Develop a database schema that incorporates keys and constraints | Cognitive | 3 | 3 |
| 4 | Formulate SQL queries to retrieve information from a relational database. | Cognitive | 5 | 4 |

## TOPICS COVERED:

**Theory:**

| Week | Topics |
|---|---|
| 1 | Introduction to Database Management Systems / File Processing Systems Database System Concepts and Architecture |
| 2-3 | Database Modeling using Entity-Relationship, Normalization |
| 4-6 | Relational Model, Relational Algebra, Relational Calculus. |
| 7-8 | Query Languages: SQL, , |
| 9-10 | Design of Relational databases |
| 11-12 | Database design and implement |
| 13 | Indexing and sorting,        Query process |
| 14 | Distributed Database / Database Security, Object Oriented DBMS, Document Oriented DBMS, Spatial and Spatio-Temporal DBMS |
| 15 | Data using and data warehousing, Web application using PHP and XML, |

| | |
|---|---|
| | Emerging Applications |
| 16 | No SQL |
| 17 | Integration of Artificial Intelligence (AI) and Database Management System (DBMS) technologies |
| | Hadoop and Spark as data processing frameworks for Big Data Analytics |
| 18 | **ESE** |

**Labs:**

| | |
|---|---|
| 1. | ER modelling |
| 2. | Introduction to MySQL workbench |
| 3. | Relational algebra relational calculus |
| 4. | Logics operators single row functions |
| 5. | DDL and constraints |
| 6. | DML and Aggregate functions |
| 7. | Subqueries |
| 8. | Join operators |
| 9. | Views |
| 10. | Indexing and sorting |
| 11. | Advanced topics |

**TEXT AND MATERIAL:**

**Textbooks:**

a. Fundamentals of Database Systems, (7th Edition), by Elmaeri & Navathe, 2016, Addison-Wesley.

**References Material:**

c. Data base management systems, (3$^{rd}$Edition) by Raghu Ramakrishna, McGraw Hill, ISBN Number 0-07-246563-8.

d. Database System Concepts (7thEdition) by Avi Silberschatz, Henry F. Korth, S. Sudarshan, 2019

**ASSESMENT SYSTEM:**

**1. CLOs Assessment**

| Cognitive | Psychomotor | Affective |
|---|---|---|
| Spreadsheet | - | - |

**2. Relative Grading**

| Theoretical/Instruction | | | | 67% |
|---|---|---|---|---|
| | Assignments10% | | | |
| | Quizzes10% | | | |
| | Mid Exams30% | | | |
| | End Semester Exam50% | | | |
| **Practical Work** | | | | 33% |
| *Laboratory Work* | | | 70% | |
| | Laboratory Attendance20% | | | |
| | Laboratory Report20% | | | |
| | Laboratory Quiz30% | | | |
| *Viva/Quiz* | | | 30% | |
| **Total** | | | | **100%** |