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| **Course-31 Title: Database System** |  |
| **Course No.:CCE-223 Credit : 3 Contact Hours: 3** | **Total Marks: 100** |

**11.1 Rationale:**

A computer engineer needs to know the fundamentals of database architecture, database management systems, and database systems, principles and methodologies of database design, and techniques for database application development.

**11.2 Objectives:**

1. an understanding of the needs for and uses of database management systems in business;
2. an understanding of the context, phases and techniques for designing and building database information systems in business;
3. an understanding of the components of a computerized database information system (application)
4. an ability to correctly use the techniques, components and tools of a typical database management system -- such as Access 2000 or Oracle 8i -- to build a comprehensive database information system (application);
5. an ability to design a correct, new database information system for a business functional area and implement the design in either Access 2000 or Oracle 8i;
6. an introductory understanding of some advanced topics in database management, e.g., object-relational databases and design, distributed databases, database administration (security, backup and restore, tuning) and data warehousing.

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| **11.3**  **Learning Outcomes** | **11.4**  **Course Content** | **11.5**  **Teaching Strategy/ Learning Experience** | **11.6 Assessment Strategy** |
| * Define Database * Explain advantage of Database over file system * Describe different data model | Database Concepts: Files and Databases, Database Management systems, Data models | **Lecture, exercise** | **Assignment,quiz,short question.** |
| * Explain Relational Data model * Apply RDM in DB design * Describe different types of attribute | Relational Data Model: Relations, Domains, Attributes and Tuple | **Lecture, exercise** | **Assignment,quiz,short question.** |
| * Evaluate anomalies in DB design * Identify different normal form * Apply normalization in DB design * Convert one normal form to another normal   Form | Anomalies, Functional Dependency, First, Second and third normal forms, Boyce-Codd Normal form | **Lecture, exercise** | **Assignment,quiz,short question.** |
|  | Relational Calculus Based Languages: SQL, Relational algebra and Set operations. | **Lecture, exercise** | **Assignment,quiz,short question.** |
| * Explain decomposition and synthesis algorithm * Define lossless decomposition | Relational Database Design: Relational design criteria, Lossless decomposition, decomposition algorithms, synthesis algorithms. | **Lecture, exercise** | **Assignment,quiz,short question.** |
| * Define OODD * Describe advantage of OODD * Differentiate fourth and fifth normal form | Advance Database Concepts: Fourth and fifth normal forms, Object-oriented databases. | **Lecture, exercise** | **Assignment,quiz,short question.** |
| * Define entity * Relationship,relationship set. * Apply E-R approach to DB design | Entity-Relationship (ER) approach: The ER model and its constructs, ER modeling in logical database design. | **Lecture, exercise** | **Assignment,quiz,short question.** |
| * Explain transformation of ER model to SQL | Transformation of the ER model to SQL | **Lecture, exercise** | **Assignment,quiz,short question.** |
| * Architecture of DDBMS * Advantage of DDBMS * Explain pitfalls of DDBMS | Distributed database design. | **Lecture, exercise** | **Assignment,quiz,short question.** |
|  | Optimization and evaluation of relational queries: conjunctive query optimization, optimization of queries involving union and difference operators, algorithms for performing joins. | **Lecture, exercise** | **Assignment,quiz,short question.** |

**RECOMMENDED BOOKS AND PERIODICALS**