CIS 285  Intro to Database Concepts

CREDIT HOURS: 3.00
CONTACT HOURS: 45.00

COURSE DESCRIPTION:
Prereq: CIS 203 or CIS 207 or CIS 209 or CIS 223 or CIS 224 or CIS 259
Designed to provide students with an overview of database management system architecture and environment, with emphasis on database processing, physical representation, modeling, commercial systems and database implementation.

EXPECTED COMPETENCIES
Upon successful completion of this course, the student will:

Demonstrate proficiency in the following chapters:

- Understand the Premiere Products database, a database for a distributor of appliances, house wares, and sporting goods called Premiere Products.
- Understand the Henry Books database, a database for a chain of bookstores called Henry Books.
- Understand the concepts and terminology associated with relational databases.
- Create and run SQL commands.
- Create tables using SQL.
- Identify and use data types to define the columns in SQL tables.
- Understand and use nulls.
- Add rows to tables.
- Retrieve data from a database using SQL commands.
- Use compound conditions.
- Use computed columns.
  - Use the SQL Like operator.
  - Use the SQL IN operator.
- Sort data using the ORDER BY command.
- Sort data using multiple keys and in ascending and descending order.
- Use SQL functions.
- Use nested sub queries.
- Group data using the GROUP BY command.
- Select individual groups using the HAVING clause.
- Retrieve columns with null values.
- Retrieve data from more than one table by joining tables.
- Use the IN and EXISTS operators to query multiple tables.
- Use a sub query within a sub query.
- Use an alias.
- Join a table to itself.
- Perform set operations (union, intersection, and difference).
- Use the ALL and ANY operators in a query.
- Use the COMMIT and ROLLBACK commands to make permanent data updates or to cancel updates.
  - Change data using the UPDATE command.
  - Add new data using the INSERT command.
  - Delete data using the DELETE command.
  - Create a new table from an existing table.
  - Use nulls in UPDATE commands.
  - Alter the rows in an existing table.
  - Change the structure of a table.
  - Understand, create, and drop views.
  - Recognize the benefits of using views.
  - Grant and revoke database privileges to users.
  - Create, use, and drop an index.
  - Understand the purpose, advantages, and disadvantages of using an index.
  - Understand and obtain information from the system catalog.
  - Use integrity constraints to control data entry.
  - Use concatenation in a query.
  - Create a view for a report.
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Course Syllabus

- Create a query for a report
- Change column headings and formats in a report
- Add a title to a report
- Group data in a report
- Include totals and subtotals in a report
- Send a report to a file that can be printed
- Embed SQL commands in COBOL
- Retrieve single rows using embedded SQL
- Update a table using embedded INSERT, UPDATE, and DELETE commands
- Use cursors to retrieve multiple rows in embedded SQL
- Update a database using cursors
- Learn how to handle errors in programs containing embedded SQL commands
- Provide a general introduction to the field of database management
- Understand basic database terminology
- Describe the advantages and disadvantages of database processing
- Provide a brief history of database management

Describe the hierarchical and network data model

Introduce Premiere Products, the company that is used as a basis for many of the examples throughout the text

Describe the relational model

Present QBE (Query-by-Example)

Discuss the use of criteria in QBE

Examine the creation of calculated columns in QBE

Present the manner in which tables can be joined in QBE

Discuss the relational algebra

Introduce the SQL language

Discuss the use of simple and compound conditions in SQL

Present the use of computed fields in SQL

Examine the use of SQL built-in functions

Discuss the use of nested SQL queries

Examine the grouping in SQL

Examine the way tables can be joined in SQL

Discuss the union operator in SQL

Discuss views: what they are, how they are described, and how they are used

Discuss the use of indexes for improving performance

Examine the security features of a DBMS

Explain entity and referential integrity

Discuss the manner in which the structure of a relational database can be changed

Define the catalog and explain its use

Discuss the integrity support within SQL

Present the idea of functional dependence

Define first normal form (1NF), second normal form (2NF), and third normal form (3NF)

Describe the problems associated with tables (relations) that are not in 1NF, 2NF, or 3NF, along with the mechanism for converting to all three

Discuss the problems associated with incorrect conversions to 3NF

Define fourth normal form (4NF)

Describe the problems associated with tables (relations) that are not in 4NF and describe the mechanism for converting to 4NF
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• Discuss the general process and goals of database design
• Define user views and explain their function
• Explain how to produce a pictorial representation of a database design
• Present a methodology for database design at the information level as well as examples illustrating the use of this methodology
• Explain the process of creating a design that is appropriate for a relational model system from the information-level design
• Illustrate the design process with a comprehensive example
• Discuss the following nine functions, or services, that should be provided by a DBMS and the manner in which these services are typically provided:
  a. data storage, retrieval, and update;
  b. user-accessible catalog;
  c. shared update support;
  d. backup and recovery services;
  e. security services;
  f. integrity services;
  g. data independence support;
  h. replication support; and
  i. utility service
• Discuss the need for database administration (DBA)
• Explain the role of DBA in formulating and implementing database policies
• Discuss the role of DBA with regard to the data dictionary, user training, and the selection and support of a DBMS
• Discuss the role of DBA in the database design process
• Describe distributed database management systems
• Discuss client/server systems
• Define data warehouses and explain their uses
• Discuss the general concepts of object-oriented database management systems
• Summarize the impact of the Internet and Intranets on database management systems

ASSESSMENT METHODS

Student performance may be assessed by examination, quizzes, case studies, oral reports, group discussion, written reports or presentations. The instructor reserves the option to employ one or more of these assessment methods during the course.

GRADING SCALE

90%-100% = A
80%-89.9% = B
70%-79.9% = C
60%-69.9% = D
<60% = E