Course Acronym:	CIS
Course Number:	80
Descriptive Title:	Database Programming
Division:	Business
Department:	Computer Information Systems
Course Disciplines:	Computer Information Systems
Catalog Description:	The effective and efficient use of the structured query programming language (SQL), used in Oracle, SQL Server, and many other database applications, is introduced and developed in lectures and reinforced through a series of lab projects of increasing complexity. Topics include the building and manipulation of tables, data retrieval, and data administration, as used in modern business.
Prerequisite:	
Co-requisite:	
Recommended Preparation:	Computer Information Systems 28 with a minimum grade of C or equivalent experience in database design
Enrollment Limitation:	
Hours Lecture (per week):	3
Hours Laboratory (per week):	3
Outside Study Hours:	6
Total Course Hours:	108
Course Units:	4
Grading Method:	Letter Grade only
Credit Status:	Credit, degree applicable
Transfer CSU:	Yes
Effective Date:	Prior to July 1992
Transfer UC:	Yes
Effective Date:	
General Education: ECC	Area 4B - Language and Rationality: Communication and Analytical Thinking
Term:	
Other:	
CSU GE:	
Term:	

Other:	
IGETC:	
Term:	
Other:	
Student Learning Outcomes:	**SLO #1 Tables and Relationships** Design and develop tables and relationships for common business problems. **SLO #2 Solving Common Business Problems** Solve common business oriented problems by using an application programming language to access database for answers to common business queries. **SLO #3 Conditional Statements** Develop conditional statements and multiple level "if" statements to query database tables. **SLO #4 Program Code** Write programming code to manipulate database tables. **SLO #5 Efficient Programming Techniques** Demonstrate use of efficient programming techniques.
Course Objectives:	1. Design and develop tables and relationships for common business problems. 2. Solve common business oriented problems by using the SQL programming language to create and process tables. 3. Develop advanced data retrieval queries using conditional statements, join techniques, and row and aggregate functions. 4. Write SQL programming code to manipulate database tables, using correlated and non-correlated queries. 5. Demonstrate use of efficient SQL programming techniques.
Major Topics:	**I. History and Development of Databases and the Database Programming Languages (3 hours, lecture)** A. Database Evolution B. The Relational Database Model C. Distributed Database Management Systems D. Data Warehouses and Business Intelligence **II. Database Design Principles and Structured Programming Methods (6 hours, lecture)** A. Data Flow Versus Process Flow B. Data Modeling

C. Process Modeling

III. Methods of Design Verification for Efficient Programming Techniques (6 hours, lecture)

A. Normalization and De-Normalization

B. Data Integrity Rules

C. Constraints

D. Reference and Check Clauses

E. Indexing

IV. Language Structure (6 hours, lecture)

A. SQL Syntax

B. Data Definition Language (DDL)

V. Tables: Creating, Processing, Indexing, Searching, and Sorting (15 hours lecture)

A. Relational Schemas

B. Create, Insert, Update, Delete

C. Primary and Foreign Keys

D. SQL Data Types

E. Indexes

F. Filters and Sorts

G. Data Integrity Rules

H. Constraints

I. Reference and Check Clauses

VI. Writing SQL Programs (15 hours, lecture)

A. Using SQL Code

B. Using Data Views

C. Using Transactions, Procedures, and Triggers

VII. Data Verification, Manipulation, and Administration (3 hours, lecture)

A. Query Optimization

B. Data Control Language (DCL)

C. Locks, Commits, and Rollbacks

VIII. Data Modeling and Data Design (6 hours, lab)

A. Entity Relationship Modeling Diagrams

B. Relational Schemas

C. Data Dictionaries

IX. Development of Relational Databases (8 hours, lab)

A. SQL Language and DDL

B. SQL Syntax and Structure

X. Table Management Using SQL (12 hours, lab)

A. Creating and Normalizing Tables Using DDL

B. Creating Keys and Indexes

C. Defining and Implementing Data Integrity Rules

D. Managing Constraints

XI. Programming to Produce Effective User and Application Output (24 hours, lab)

A. Simple and Complex Queries

B. Views

C. Inner and Outer Joins

D. Unions, Filters, and Sub-Selects

E. Row and Aggregate Functions and Predicates

F. SQL "Truth" Tables

XII. Administering Databases (4 hours, lab)

A. Privileges Using Data Control Language (DCL)

B. Locks, Commits, and Rollbacks

C. Performance Tuning Using Transactions, Stored Procedures, and Triggers

Total Lecture Hours:	54

Total Laboratory Hours:	54
Total Hours:	108
Primary Method of Evaluation:	2) Problem solving demonstrations (computational or non-computational)
Typical Assignment Using Primary Method of Evaluation:	Write the SQL programming code to declare the following variables and assign them the given values.

Variable Name,   Data Type,   Value

Student Last Name   Character   Strier

Student First Name   Character   Zachary

Student MI   Character   S

Student Address   Character   3 Main St.

Student City   Character   Torrance

Student State   Character   ME

Student Zip   Character   00467

Write the SQL program statements to display the output; do not insert or hard-code the data values in the function. Save the file as Sample1 and run and execute it. Debug as necessary.

Critical Thinking Assignment 1:	Write programming code to create subqueries using comparison operators Database: Violins 00 Output: Print one page of each output and the query code. Use the Correlated Subquery to solve the problem. Select the records where the Shipment date is more than 30 days in advance of the present date and the shipment method is not Federal Express. The output fields should be: Customer Number and Name, Shipping method, Shipment Date, Country the Shipment is to, and Freight charges. Sort the output data by using the Order By clause on the customer number and name within the query itself. Start by fields needed with the SELECT statement and then the FROM clause to select the table. Use the WHERE to subselect the records on ship date and on freight. Use the calculate commands to determine if ship date is more than 30 days from today's date. Use AND as the Boolean operator to retrieve only records meeting both conditions.
Critical Thinking Assignment 2:	Write the SQL programming code to produce the following reports. Database: Violins 00 Output: Print one page of the report and print out the programming code. Create a report from the Order Processing table using the UNION and Union Join ALL operators to select data from multiple tables. Reports must contain your company logo and the date. The output design should be per company standards and be previously developed using a report generator front end. Create the report using the fields: Customer Number and Name, Shipping method, Shipment Date Country the Shipment is to, Freight charges Use the date format model element to convert the date to text. Create a Column Alias to use as the header for the field Customer Number to rename it to Account Number. Sort the output data by using the Order By clause on the customer number and name. Hierarchically format the report by the shipping method field.

Other Evaluation Methods:	Homework Problems, Laboratory Reports, Multiple Choice, Other (specify), Other Exams, True/False
Instructional Methods:	Group Activities, Lab, Lecture
If other:	
Work Outside of Class:	Problem solving activity, Required reading, Skill practice, Study
If Other:	
Up-To-Date Representative Textbooks:	Bryan Syverson and Joel Murach, <u>Murach's SQL Server 2019 for Developers,</u> 1st ed. Murach Books, 2020.
Alternative Textbooks:	
Required Supplementary Readings:	
Other Required Materials:	
Requisite:	
Category:	
Requisite course(s): List both prerequisites and corequisites in this box.	
Requisite and Matching skill(s):Bold the requisite skill. List the corresponding course objective under each skill(s).	
Requisite Skill:	
Requisite Skill and Matching Skill(s): Bold the requisite skill(s). If applicable	
Requisite course:	Computer Information Systems 28 with a minimum grade of C
Requisite and Matching skill(s):Bold the requisite skill. List the corresponding course objective under each skill(s).	**Define, analyze and document problems using flowcharts and programming language.** CIS 28 - Use queries to perform calculations on data contained in tables. **Analyze and design systems and implement solutions.** CIS 28 - Design, create, and modify table structures.
Requisite Skill:	equivalent experience in database design
Requisite Skill and Matching skill(s): Bold the requisite skill. List the corresponding course objective under each skill(s). If applicable	Successful completion of this course requires a fundamental understanding of common marketplace database structure and organization.

Enrollment Limitations and Category:	
Enrollment Limitations Impact:	
Course Created by:	Stanley Niemczycki
Date:	03/01/1985
Original Board Approval Date:	
Last Reviewed and/or Revised by:	Monica Chaban
Date:	03/08/2019
Last Board Approval Date:	12/19/2022