Lambton College

CSD-2206 Database Design & SQL

Computer Studies

Course Number:	Co-Requisites:	Pre-Requisites:
CSD-2206	N/A	N/A
Prepared by:	Jim Cooper, Professor	
Approved by:	Chris Slade, Senior Dean	
Approval Date:	Thursday, June 16, 2022	
Approved for Academic Year:	2022-2023	
Normative Hours:	90.00	

Course Description

An introduction to relational database design and Structured Query Language (SQL). Students (1) analyze user requirements and construct data models using entity-relationship diagrams (ERD); (2) use Data Definition Language (DDL) to create and modify the structure of database objects; (3) use Data Manipulation Language (DML) to add, delete, and modify data in a database; (4) prepare technical documentation for a database project; (5) develop single-table and multiple-table database queries; (6) implement views and indexes; and (7) develop three-tier database applications using the MVC architecture that employs multiple-table views. As a term project, students design and implement a multiple-table database based on typical business requirements.

Course Learning Outcomes/Course Objectives

1. **Analyze user requirements and construct data models using entity-relationship diagrams (ERD)**

    1.1   Use the System Development Life Cycle (SDLC) process for database development

    1.2   Create ER diagram components that represent entities, attributes, and relationships according to diagramming conventions

    1.3   Implement different types of keys - primary, foreign, and unique

    1.4   Implement one-to-one, one-to-many, and many-to-many relationships

    1.5   Implement relationship cardinality

    1.6   Resolve many-to-many relationships with intersection entities

    1.7   Implement recursive relationships

    1.8   Identify relationship name and state relationships between entities in ER language

    1.9   Implement supertype and subtypes entities

    1.10 Construct ERDs that incorporate historical data for time and price

1.11 Document business rules

1.12 Apply normalization rules for First Normal Form (1NF), Second Normal Form (2NF), and Third Normal Form (3NF)

1.13 Transform an ERD logical data model to a relational (physical) data model

2. Use Data Definition Language (DDL) to create and modify the structure of database objects

2.1 Create the DDL statements to build a database

2.2 Implement supertype/subtype mapping

2.3 Create database tables using the CREATE TABLE statement

2.4 Implement primary, foreign, and unique keys

2.5 Assign column data types

2.6 Employ an IDENTITY clause in a CREATE TABLE statement

2.7 Create and use a SEQUENCE object

2.8 Implement NEXT VALUE FOR, .NEXTVAL, PREVIOUS VALUE FOR, and .CURRVAL functions

2.9 Construct and execute ALTER, DROP, RENAME, and TRUNCATE statements

2.10 Delete database tables using the DROP statement

2.11 Analyze user requirements and implement database constraints (PRIMARY KEY, FOREIGN KEY, UNIQUE KEY, CHECK, NOT NULL)

2.12 Create constraints at the column and table levels using the CREATE TABLE and ALTER TABLE statements

2.13 Apply meaningful constraint names

2.14 Use the ALTER TABLE statement to add, drop, disable, and enable constraints

2.15 Determine test data requirements

2.16 Perform testing procedures to validate and modify violations of data integrity (constraint) rules

2.17 Integrate test data requirements into a data generation software tool (i.e. Mockaroo)

2.18 Validate test data

2.19 INSERT test data into a database

3. Use Data Manipulation Language (DML) to add, delete, and modify data in a database

3.1 Create a copy of a database table

3.2 Use the INSERT, UPDATE, DELETE statements to modify data in a database

3.3 Use the INSERT statement with explicit and implicit column names

3.4 Insert rows containing NULL values into a database data

3.5 Use the ALTER TABLE statement to add a new column to an existing table

4. Prepare technical documentation for a database project

4.1 Prepare technical documentation according to user specification

4.2   Submit project milestones on schedule

5. **Develop single-table and multiple-table database queries**

   5.1   Limit column selection with SELECT column-list

   5.2   Limit row selection with the WHERE clause

   5.3   Implement comparison operators

   5.4   Implement logical comparisons

   5.5   Sort rows using the ORDER BY clause

   5.6   Implement single-row functions

   5.7   Implement database joins

   5.8   Implement group functions

   5.9   Implement single-row and multiple-row subqueries

6. **Implement views and indexes**

   6.1   Create simple and complex views

   6.2   Implement database indexes

   6.3   Create composite (concatenated) indexes built over multiple columns in a database table

   6.4   Drop views and indexes

7. **Develop three-tier database applications using the MVC architecture that employs embedded SQL and views**

   7.1   Create multiple-table database for Web applications

   7.2   Create multiple-table views for Web applications

   7.3   Develop three-tier database applications using the MVC architecture

Relationship to Essential Employability Skills

This course contributes to your program by helping you achieve the following Essential Employability Skills:

EES 3.4   Apply a systematic approach to solve problems. (T, A,)

EES 3.5   Use a variety of thinking skills to anticipate and solve problems. (T, A,)

EES 4.6   Locate, select, organize and document information using appropriate technology and information systems. (T, A,)

Relationship to Vocational Learning Outcomes

This course provides the opportunity for you to achieve the following Program Vocational Learning Outcomes (VLO) which will be taught and evaluated at an taught (T), assessed (A) or culminating peformance (CP) level:

CPCM - Computer Programmer

VLO 1   Identify, analyze, develop, implement, verify and document the requirements for a computing environment. (T, A)

VLO 4   Implement robust computing system solutions through validation testing that aligns with industry best practices. (T, A)

VLO 12   Model, design, implement, and maintain basic data storage solutions. (T, A)

CPCT - Computer Programmer

VLO 1   Identify, analyze, develop, implement, verify and document the requirements for a computing environment. (T, A)

VLO 4   Implement robust computing system solutions through validation testing that aligns with industry best practices. (T, A)

VLO 12   Model, design, implement, and maintain basic data storage solutions. (T, A)

CPRO - Computer Programmer

VLO 1   Identify, analyze, develop, implement, verify and document the requirements for a computing environment. (T, A)

VLO 4   Implement robust computing system solutions through validation testing that aligns with industry best practices. (T, A)

VLO 12   Model, design, implement, and maintain basic data storage solutions. (T, A)

CSAC - Computer Software and Database Development

VLO 1   Evaluate system requirements and implement multi-tiered (client, server, and database) web applications to meet client requirements. (T, A)

VLO 2   Design, model, implement, maintain and query databases using an enterprise-level relational database management system (DBMS) to meet end-user specifications. (T, A)

CSAM - Computer Software and Database Development

VLO 1   Evaluate system requirements and implement multi-tiered (client, server, and database) web applications to meet client requirements. (T, A)

VLO 2   Design, model, implement, maintain and query databases using an enterprise-level relational database management system (DBMS) to meet end-user specifications. (T, A)

CSAT - Computer Software and Database Development

VLO 1   Evaluate system requirements and implement multi-tiered (client, server, and database) web applications to meet client requirements. (T, A)

VLO 2   Design, model, implement, maintain and query databases using an enterprise-level relational database management system (DBMS) to meet end-user specifications. (T, A)

Learning Resources

Required

Cooper, J. (2021). Relational Database Design and SQL. (1st ed.).
eBook (https://campus-shop.lambtoncollege.ca)

Student Evaluation

Term Project 1 — 32%
Term Project 2 — 8%

Tests (2 @ 12% each) — 24%
Practice Exercises (40 evenly weighted) — 36%

Grade Scheme

The round off mathematical principle will be used. Percentages are converted to letter grades and grade points as follows:

Mark (%)	Grade	Grade Point	Mark (%)	Grade	Grade Point
94-100	A+	4.0	67-69	C+	2.3
87-93	A	3.7	63-66	C	2.0
80-86	A-	3.5	60-62	C-	1.7
77-79	B+	3.2	50-59	D	1.0
73-76	B	3.0	0-49	F	0.0
70-72	B-	2.7			

Prior Learning Assessment and Recognition

Students who wish to apply for prior learning assessment and recognition (PLAR) need to demonstrate competency at a post-secondary level in all of the course learning requirements outlined above. Evidence of learning achievement for PLAR candidates includes:
• Other: Students interested in PLAR consideration are advised to discuss details with the program coordinator.

Course Related Information

Refer to Program Related Information

Program Related Information

CPRO - Computer Programmer
Program policies pertaining to CSD courses in the CPRO and CSAC programs are posted in D2L for all CSD courses. These policies explain the waiver option as well as policies related to evaluations and classroom conduct. Students are expected to be aware and abide by these policies.

CSAC - Computer Software and Database Development
Program policies pertaining to CSD courses in the CPRO and CSAC programs are posted in D2L for all CSD courses. These policies explain the waiver option as well as policies related to evaluations and classroom conduct. Students are expected to be aware and abide by these policies.

College Related Information

Academic Integrity
Lambton College is committed to high ethical standards in all academic activities within the College, including research, reporting and learning assessment (e.g. tests, lab reports, essays).
The cornerstone of academic integrity and professional reputation is principled conduct. All scholastic and academic activity must be free of all forms of academic dishonesty, including copying, plagiarism and cheating.

Lambton College will not tolerate any academic dishonesty, a position reflected in Lambton College policies. Students should be familiar with the Students Rights and Responsibilities Policy, located at lambtoncollege.ca. The policy states details concerning academic dishonesty and the penalties for dishonesty and unethical conduct.

Questions regarding this policy, or requests for additional clarification, should be directed to the Lambton College Student Success Department.

Students with Disabilities

If you are a student with a disability please identify your needs to the professor and/or the Accessibility Centre so that support services can be arranged for you. You can do this by making an appointment at the Accessibility Centre or by arranging a personal interview with the professor to discuss your needs.

Student Rights and Responsibility Policy

Acceptable behaviour in class is established by the instructor and is expected of all students. Any form of misbehaviour, harassment or violence will not be tolerated. Action will be taken as outlined in Lambton College policy.

Date of Withdrawal without Academic Penalty

Please consult the Academic Regulations and Registrar's published dates.

Waiver of Responsibility

Every attempt has been made to ensure the accuracy of this information as of the date of publication. The content may be modified, without notice, as deemed appropriate by the College.

Students should note policies may differ depending on the location of course offering. Please refer to campus location specific policies:

LAMBTON COLLEGE POLICIES – applicable to all Lambton College students.

- Student Rights & Responsibilities & Discipline policy (2000-5-1)
- Test & Exam Writing Protocol (2000-1-6)
- Evaluation of Students (2000-1-3)
- (https://www.lambtoncollege.ca/custom/Pages/Policies/Policies.aspx)

CESTAR COLLEGE:

- https://www.lambtoncollege.ca/Programs/International/Lambton_in_Toronto/Student_Policies/

QUEENS COLLEGE:

- https://www.lambtoncollege.ca/Programs/International/Lambton_in_Mississauga/Student_Policies/

Note: It is the student's responsibility to retain course outlines for possible future use to support applications for transfer of credit to other educational institutions.