



CSIS-514A: SQL PROGRAMMING - LEVEL 1 (FORMERLY CSIS-114A)

Effective Term

Fall 2024

BOT Approval Date

10/12/2023

Discipline

CSIS - Computer Sci/Info Systems

Course Number

514A

Course Title

SQL Programming - Level 1 (formerly CSIS-114A)

Short Title

SQL Programming - Level 1

Credit Status (CB 04)

D - Credit - Degree applicable

Units**Lecture Units**

3.00

Total Units

3.00

Hours**Lecture Contact Hours**

48-54

Out of Class Hours Lecture

96-108

Total Contact Hours

48 - 54

Total Out of Class Hours

96 - 108

Total Student Learning Hours

144 - 162

Distance Education

Yes

Distance Education**Distance Education Type**

Both Fully Online and Hybrid Online

Fully Online Delivery Requirements:

a. Students must be notified via the college schedule of classes and the syllabus for the class if proctored tests are required for this course



b. Any planned face-to-face meetings, such as an orientation or study session, must be optional

c. The MSJC curriculum committee requires the use of accessible, asynchronous discussion as a component of every fully online course

Are you using publisher content?

No

Regular Substantive Interaction

Instructor-to-student, student-to-student, and student-to-content contact shall be distributed in a manner that will ensure regular substantive interaction (RSI) is maintained not only weekly but also for the duration of the course. Instructor interactions should be equivalent in time, quality and consistency to the engagement students would receive in a face-to-face course—for example, through announcements, discussion participation, personalized feedback, video messages, or other instructional communications. Instructors are expected to be responsive to student inquiries within a 24-72 hour time frame excluding holidays. RSI will be maintained through a variety of methods:

- **Orientation** - Students must be oriented to the online and face-to-face portions at the start of the course.
- **Announcements** - Announcements using the course management system must be posted at least weekly to keep students current on course events, due dates, materials, etc.
- **Discussion Forums** - Content-related discussion forums within the designated CMS will include appropriate instructor participation and will be initiated and maintained, with timely feedback provided. Instructors are required to monitor the discussions and related activities to provide guidance and direction. Open-ended discussion boards may be used to further learning and interaction.
- **MSJC Communication** – Instructor will use MSJC-administered communication tools (such as email or the designated CMS communication tools) to regularly communicate with and provide ease of access to students.
- **Timely Feedback** - Timely feedback on student work will be provided by the instructor, which may include comments and/or rubrics, within the Grades area of the designated CMS.
- **Scheduled Meetings** – Hybrid and synchronous courses will meet at regularly scheduled times. ADA Compliance - All course interactions and content must be designed with accessibility in mind and meet ADA requirements.

Catalog Description

This course introduces the SQL programming language and covers all of the features of the language that are needed to create and maintain single-table database systems. SQL features that will be covered include: language syntax, data query language (DQL) elements, data manipulation language (DML) elements, and basic data definition language (DDL) elements. No prior programming experience required. (formerly CSIS-114A)

Codes

TOP Code (CB 03)

0707.20* - *Database Design and Administration

CIP Code

11.0802 - Data Modeling/Warehousing and Database Administration.

Repeatability Code

No

Grading Option

Letter grade OR P/NP

GE Information

Check GE Types Requested

AA/AS D2 - Communication & Analytical Thinking

Learning Objectives

Learning Objectives

Learning Objective

1. Construct an explanation/analysis of the generic systems development life cycle (SDLC) model and SQL's role in the implementation phase.
2. Evaluate the classification scheme for SQL statements (DQL, DML, DDL, DCL); and evaluate and categorize SQL programs into the ontology.
3. Develop and test SQL statements that use character, numeric, and/or temporal functions.
4. Develop and test SELECT statements that incorporate regular expressions.

5. Develop and test SQL programs that use subqueries.
6. Develop and test a SQL program that incorporates group functions.
7. Develop and test SQL programs that use DML commands (INSERT, UPDATE, DELETE).
8. Construct base schema objects with DDL that capture and store information in a manner that respects an individual's name, race, age and gender.
9. Analyze technical information, as well as listen effectively to, communicate orally with, and prepare memos, reports and documentation for diverse audiences.
10. Investigate and assess new sources of information and learning opportunities to stay abreast of advances in information and database technologies.
11. Construct a list of career paths related to the program of study, as well as any qualifications and/or professional certifications that may be associated with those careers.
12. Identify and propose solutions where computing and database technologies introduces barriers to diversity, equity, and inclusion.

Learning Outcome Information

Course Learning Outcomes

Learning Outcome
1. Students will prepare a SQL program that updates a database table.
2. Students will build a SQL program to retrieve specific records from joined database tables.
3. Students will design and build database tables.
4. Students will demonstrate the correct implementation of numeric, character, and date functions in a SQL query.
5. Students will identify relevant resources to further their understanding of database technologies.

Program Learning Outcomes

Learning Outcome
Recognize that a system consists of people, procedures, hardware, software, and data within a global environment.
Apply systems concepts in the investigation, evaluation, and resolution of information technology problems.
Recognize how the very large amounts of data collected by modern organizations can be used to review, redesign, and improve processes.
Employ applications software and software tools in the application of information technologies to help individuals, groups, and organizations achieve their goals.
Analyze existing processes based on interviewing, observation, documentation, analysis and other similar methods.
Research and apply industry reference models and best practices in order to improve process designs.
Analyze technical information, as well as listen effectively to, communicate orally with, and prepare memos, reports and documentation for a wide range of audiences.
Investigate and assess new sources of information and learning opportunities to stay abreast of emerging information and computing technologies.
List career paths related to the program of study, as well as any qualifications and/or professional certifications that may be associated with those careers.

Institutional Learning Outcomes

Critical Thinking: The student will analyze problems, gather and synthesize relevant information, evaluate ideas, information, and evaluate alternative points of view to create, innovate and implement effective solutions.

Information and Technology Literacy: The student will access, interpret, evaluate, and apply relevant information sources and digital media effectively, and in an ethical and legal manner.

Social Awareness: The student will recognize and analyze the interconnectedness of global, national, and local concerns, analyzing cultural, political, social, and environmental issues from multiple perspectives and appreciate similarities and differences among cultures.

Content

Course Lecture Content

1. Overview of database concepts
 - a. Database terminology
 - b. Database management systems
 - c. Database design and modelling
 - d. Structured Query Language
2. Basic SQL SELECT statements
 - a. Select statement syntax
 - b. Column aliases
3. Operations in the Select statement
 - a. Where clause syntax
 - b. Comparison operators
 - c. Logical operators
4. NULL Values
5. Order By clause
 - a. Retrieving rows and sorting data
 - b. Sorting
 - c. Secondary sort
6. Selected single-row functions
 - a. Case conversion functions
 - b. Character functions
 - c. Number functions
 - d. Date functions
7. Group functions
 - a. Sum
 - b. Avg
 - c. Count
 - d. Max
 - e. Min
8. Grouping data
 - a. Group by
9. Subqueries
 - a. Single-row subqueries
 - b. Multiple-row subqueries
 - c. Multiple-column subqueries
10. Simple DML
 - a. Table creation
 - b. Column datatypes
 - c. Constraints
 - d. Views
11. Professional comportment
 - a. Ethics
 - b. Working in a team to design and develop database solutions
 - c. Maintaining a personal 'work' journal
 - d. Lifelong learning - staying abreast of new and emerging database technologies
12. Diversity, Equity, and Inclusion Issues related to Information and Database Technologies
 - a. Exploring algorithmic biases that may be introduced in machine learning and database systems and how these biases impact marginalized groups.
 - b. Data modelling and encoding biases can omit or conflate key descriptors of a population, and we explore how these types of biases can effect marginalized groups.

Methods of Instruction

Method

Observation and Demonstration

Integration

Guided practice and demonstration will illustrate lecture principles and reading assignments with a focus on the development of SQL programs that incorporate group functions, SQL programs that use sub-queries, and SELECT statements that incorporate regular expressions.

DE Adaptations for MOI

Guided practice sessions include using simulations and screen capture software, instructor prepared materials which may include PDF documents for screen reader accessibility, online instructional videos with closed captioning or transcripts, and/or links to web pages dealing with Access demonstrations. These demonstrations will then be deployed in the appropriate learning module in the CMS, and shared with students in either an asynchronous or synchronous fashion. Videos will be captioned, and presentations will have been checked for accessibility.

Method

Lecture

Integration

Lecture (with supporting visual materials - presentations, multimedia) will introduce conceptual and practical skills such as: the development of sql statements that use character, numeric, and/or temporal functions; SELECT statements that incorporate regular expressions; SQL statements that use the DML commands (UPDATE, DELETE, and INSERT). Weekly presentations on professional comportment (e.g. teamwork, work journals, ...), DEI issues (e.g. the impact of algorithmic and data encoding bias on marginalized groups in the development of public policy) will serve as the jumping off point for online discussion activities.

DE Adaptations for MOI

Lecture presentations (e.g. accessible slide decks, captioned videos) will be posted on the CMS in the appropriate learning module, and student follow-up will be mediated in chat and/or discussion forums on the CMS.

Method

Discussion

Integration

Weekly / bi-weekly presentations on selected topics of professional comportment (eg. ethics, effective teamwork practices, lifelong learning, ...) and issues related to diversity, equity and inclusion (e.g. how algorithmic bias and data encoding bias could contribute to racial profiling,), will serve as the jumping off point for online discussion activities.

Discussion 'items' (eg. accessible slide decks, captioned videos) will be posted on the CMS in the appropriate learning module, and student follow-up will be mediated in chat and/or discussion forums on the CMS.

DE Adaptations for MOI

The CMS discussion facility will be used to accommodate the discussions. The instructor will post a topic along with supporting background material, and students will post their replies. Captioning will be included for any video postings.

Methods of Evaluation**Method**

Exams/Tests

Integration

Small problem / multiple choice exams will be given to evaluate the student's understanding of DQL commands (SELECT) and DML commands (INSERT, UPDATE, DELETE), the use of regular expressions to search and extract data from text, and the use of SQL sub-queries. Tests will be graded on completeness and correctness. Tests will be managed by the CMS, and where appropriate, accommodations (eg. extra time) can be provided. Instructor feedback will be returned in a timely manner (usually within one week of the assigned deadline) via the CMS using graded rubrics, directed comments in the grade area, and/or annotation included in the student document(s)

DE Adaptations for MOE

Tests will be managed by the CMS, and where appropriate, accommodations (eg. extra time) can be provided. Instructor feedback will be returned in a timely manner (usually within one week of the assigned deadline) via the CMS using graded rubrics, directed comments in the grade area, and/or annotation included in the student document(s)

Method

Projects

Integration

Several programming projects will be assigned that require the student to demonstrate the ability to develop and test SQL programs that: employ DML (UPDATE, DELETE, and INSERT) and DDL (CREATE and DROP) commands, comparison operations (=, <>, < >, ...) subqueries, and groupings. Assignments will be submitted thru the CMS, feedback and grades will be posted on the CMS.

Problems will be evaluated based on the completeness and correctness of the solution.

Projects will typically be graded within 24 hrs. of the due date.

DE Adaptations for MOE

Assignments will be submitted thru the CMS, feedback and grades will be posted on the CMS. Instructor feedback will be returned in a timely manner (usually within one week of the assigned deadline) via the CMS using graded rubrics, directed comments in the grade area, and/or annotation included in the student document(s).

Method

Class Participation

Integration

The instructor will provide an example of data encoding bias that has adversely effected a marginalized community. Based on that example, students will propose other potential scenarios of data encoding bias and the outcomes it would have on marginalized communities. Students will be evaluated on how well they describe the scenario, identify and highlight the data encoding biases contained therein, and how their proposed modifications would address the biases they identified. Instructor feedback will be provided within 3 (work) days of the assignment due date.

DE Adaptations for MOE

Discussion/participation would be facilitated by the CMS. Since the discussions will be held online, deadlines for posting would explicitly define when initial and respondent postings would be required. Grading rubrics will be posted along with the assignment.

Assignments**Assignment Type**

Other

In-class and/or outside of class

Outside of class

Formative or Summative

Formative

Assignment

Weekly Programming Projects will ask you to demonstrate mastery of the SQL programming features that were introduced this week. Each project set will include, on average, a dozen programming tasks, for example:

- List the title, cost, and purchase date for all movies purchased during 1995 or 1999.

- List the title, genre, duration and year produced for all of the science fiction films (genre=sf) that were produced before 1984.
- List the title, genre, length and production year for all of the science fiction films that were produced before 1984, with a running time of more than 75 minutes
- Use the regular expression feature of Oracle to find all movies whose title includes the word 'in'.
- Use the regular expression feature of Oracle to find all movies whose titles include three or more words.
- For all of the Shakespeare titles in the collection, show the title, purchase price, and price + 8%. Use an appropriate title for the calculated columns. Round all calculations to two decimal places. [3 cols]

How assignment will be adapted in online format

For all class modalities (online, face-to-face, hybrid), the assignment is posted on the CMS as a document, which the student downloads, and completes by appending their source code and result tables for each problem in the project set. Upon completion the student document is uploaded to the assignment folder on the CMS.

Assignment Type

Other

In-class and/or outside of class

In-class

Outside of class

Formative or Summative

Summative

Assignment

Comprehensive Final Exam

For this comprehensive exam, answer the following multiple-choice questions that were randomly drawn from the same curated set of question pools that were used for the quizzes. For example:

When using the AND operator to connect two simple conditions, _____condition(s) needs to be true in order for the compound condition to be true.

- a. The first
- b. Either
- c. Both
- d. None

Which of the following is a correct statement?

- a. An asterisk can be used as the argument for the COUNT function to include NULL values in the results.
- b. The NULL keyword can be included in the argument of the COUNT function to include NULL values in the results.
- c. The ALL keyword can be included in the argument of the COUNT function to include NULL values in the results.
- d. The INCLUDE NULLS keywords can be included in the argument for the COUNT function to include NULL values in the results.

If a SELECT statement contains HAVING, GROUP BY, and WHERE clauses, the _____ clause will be processed first.

- a. HAVING
- b. GROUP BY
- c. WHERE
- d. ORDER BY

How assignment will be adapted in online format

Question pools are stored on the CMS and tests are generated 'on the fly' from these pools by the CMS. The CMS scores the final exam, and presents immediate feedback to the student. Tests are timed, and the CMS can provide extra-time accommodations for qualified students. Feedback is provided immediately upon completion of the via the CMS.



Assignment Type

Writing

In-class and/or outside of class

Outside of class

Formative or Summative

Summative

Assignment

Based on our class discussions and/or outside readings on data encoding bias, find additional examples (or propose your own scenarios) as to how data modelling and capture biases would be introduced in information and database systems. These limitations and/or biases will influence the kinds of information that can be provided by the information system and effect decision making policies and practices that rely on this data. Describe how these limitations and/or biases would impact marginalized populations in the either the public or private arena e.g. distribution of funds in city planning budgets, hiring practices within an organization, ...

How assignment will be adapted in online format

This assignment will be administered through the assignments area of the course management system. Students will post their scenario to the appropriate discussion thread of the course management system. Postings will be graded within one week of the assignment deadline.

Assignment Type

Reading

In-class and/or outside of class

Outside of class

Formative or Summative

Formative

Assignment

Read the chapter and supplemental lecture material on the DML commands (UPDATE, DELETE, and INSERT). Once you have a good understanding of the material, review the key terms in the module summary, and provide a working definition and example for each term. Check your work against the module content. For those terms you didn't understand, review the appropriate section in the module. If you are unclear about any of the techniques or terms presented in the module post a question in the QUESTIONS discussion forum.

How assignment will be adapted in online format

No additional adaptation is required.

Questions (from the student) will be posted in a discussion forum on the CMS, and will be responded to within two work days of the posting.

Course Materials**Textbooks**

Casteel, Joan (2016). Oracle 12c:
ISBN-13: 978-1305251038 | ISBN-10: 1305251032

Class Size Information**Class Size**

35

Class Size Category

B - Facilitated learning 35

Diversity and Inclusion

Explain how diversity and inclusion(e.g., gender, culture/race, sexuality, etc.) is infused into the course.

Instruction acknowledges the challenges that technology poses to marginalized populations, and how algorithmic and data encoding bias can have untoward effects on policy making, distribution of resources, and continued marginalization.

Diversity, equity and inclusion is infused in the course through an acknowledgement of biases and prejudices that exist, and a holistic view that each individual can make a positive impact in combating bias and prejudice in the workplace and society in their sphere of influence.

Describe how assignments, instruction, evaluation, course content, and interactions are contextualized for diverse learners promoting an equitable course.

Learning materials are ADA compliant.

To accommodate different learning styles: instruction will include lecture and coding/programming demonstrations, discussion activities will provide opportunities for interpersonal discussions. Tutors are available in the Learning Resource centers at the different campus sites.

Students will demonstrate mastery of the material primarily with programming assignments and quizzes. Computing resources (database servers and client software) for these programming activities and practice activities will be provisioned by the college.

Interactions

Explain how the course will incorporate student-to-student interaction.

A 'student cafe' will be available for students to chat amongst themselves (w/o instructor interaction (or 'peeping') unless called in to examine inappropriate behaviors: bullying, harassment, ...).

Students will also engage with one another in periodic discussion activities. These topics generally focus on professional comportment, life-long learning and barriers to diversity, equity and inclusion, as well as aspects and features of the SQL programming language, and working with others. There is also a shared 'reflection' discussion where students have the opportunity to share (as much or as little) as they choose about their learning process in the class, areas where they excelled, areas where they had trouble, and any barriers they encountered along the way.

Explain how the course will incorporate instructor-to-student interaction.

Instructor-student interaction includes pre-semester welcome letter, course announcements and reminders that highlight major calendar events. Throughout the course module/chapter introductions, overviews and detailed lecture and video presentations on database design, data query language elements, data manipulation language elements, and data definition language elements are also presented. Timely feedback is provided on assignments and database projects. Students can initiate interaction in the classroom, via email, and during office hours (physical or online).

Explain how the course will incorporate student-to-content interaction.

Assigned projects that require the student to examine the material and apply what they've learned in the design and development of all aspects of SQL programming (data definition, manipulation, and query language elements, as well as data control elements). The course structure permits multiple attempts on projects and quizzes. Weekly / bi-weekly peer-to-peer discussion activities are designed to foster community and to explore different perspectives on career choices, professional comportment and working with others.

Explain how the course will incorporate student-to-self interaction (metacognitive).

Self reflection activities occur a couple of times during the course where consideration is given to their approach to learning the material, how successful they've been in mastering the material, and how they might change their study habits / participation in the course, so as to satisfy the goals they had set for themselves when entering the course.

How are they doing with data queries that incorporate conditional clauses – are those 'human language' specifications being correctly translated in their 'computing language corollaries. Are the reporting features of GROUP BY and HAVING make sense or are they troublesome – what might help to make the process more understandable. Which aspects of database programming remain problematic, and how might these issues be resolved.