Course Outline

MAD 103 Data Fundamentals

Course ID: 028921 **Academic Year:** 2024/25

Course Description:

This course is designed to introduce the student to data representation, storage and transmission as used in web and mobile application development. Students will be introduced to popular formats for passing data as well as methods for storing and retrieving information from a database. Students will use a relational database management system (DBMS) for managing database tables and SQL (Structured Query Language) for creating, altering, retrieving and deleting information and table structures.

Pre-Requisites:	None	**Category:**	Vocational
Co-Requisites:	None	**Course Credits:**	3.00
Special Conditions:	None	**Academic Level:**	Credit (Post Sec)

Instructional Hours:	Classroom Instruction	0
	Laboratory/Workshops	45
	Other	0
	Total Hours	**45**

Academic Department:

Windsor: Zekelman School of Business
Chair: Angelo DeMarco
Chatham:
Chair:

Revised By: Darren Takaki

Last Revision: 2019/04/17

Required Tools, Equipment, and Learning Resources:

Essential Employability Skills (EES):

	Description	Teach	Assess
1)	Communication: Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience.		
2)	Communication: Respond to written, spoken, or visual messages in a manner that ensures effective communication		
3)	Numeracy: Execute mathematical operations accurately	✔	✔
4)	Critical Thinking: Apply a systematic approach to solve problems	✔	✔
5)	Critical Thinking: Use a variety of thinking skills to anticipate and solve problems	✔	✔
6)	Information Management: Locate, select, organize, and document information using appropriate technology and information systems	✔	✔
7)	Information Management: Analyze, evaluate and apply relevant information from a variety of sources		
8)	Interpersonal: Show respect for the diverse opinions, values, belief systems, and contributions of others		
9)	Interpersonal: Interact with others in groups or teams in ways that contribute to effective working relationships and the achievement of goals		
10)	Personal: Manage the use of time and other resources to complete projects		
11)	Personal: Take responsibility for one's own actions, decision and consequences		

Course Learning Outcomes (CLO):

Upon successful completion of this course, the student will be able to:
(EKS = Embedded Knowledge and Skills)

- Apply relational principles and normalization techniques to the design of moderately complex databases. (CLO #1)
  EKS:
  - Identify and convert un-normalized data to 2nd and 3rd normal forms
  - Use foreign keys to implement 1:N and M:N relationships between tables in a relational database
  - Construct and interpret relational databases (ERDs) in order to document the relationships.

- Implement a relational data base in a DBMS (Data Base Management System) using both DDL and administrative tools (CLO #2)
  EKS:
  - Use SQL syntax to create tables that accurately represent the information to be stored.
  - Use SQL syntax to alter the structure of an existing table to deal with changes in data.
  - Use SQL syntax to delete a table structure and its contents properly.
  - Implement rules to enforce the relationships between tables.
  - Identify the appropriate data types for storing data.
  - Implement checks to ensure that accurate information is stored in database tables.

- Use appropriate SQL statements to manage data stored in database tables. (CLO #3)
  EKS:
  - Use INSERT statements to create single or multiple rows of information in a specified database
  - Use UPDATE statements to change data in single or multiple rows in a specified database
  - Use DELETE statements to remove single or multiple rows in a specified database

- Construct queries using SQL to retrieve data sets at an intermediate level of complexity (CLO #4)
  EKS:
  - Apply SELECT statements to retrieve single or multiple rows of data that meet a given criteria from a specified data base
  - Apply various operators such as IN, BETWEEN, LIKE, NULL and NOT in SELECT statements to construct specific sub-sets of data
  - Use various operators such as ORDER BY and GROUP BY in SELECT statements in order to present organized and properly formatted datasets
  - Use the JOIN clause in SELECT statements to construct complex datasets by joining two or more tables in a specified database

- Implement built-in functions to simplify common tasks (CLO #5)
  EKS:
  - Apply aggregate functions to form single summary values for rows of information
  - Apply string manipulation and concatenation functions to modify and join queried output.
  - Apply mathematical functions and operators to quantify queried information.

- Produce text documents, which meet the current standards for the transmission and storage of data. (CLO #6)
  EKS:
  - Examine the structure and definitions for data storage for modern applications.
  - Construct well-formed and valid documents for transmitting small quantities of data.
  - Identify and explain issues that prevent documents from being well-formed and valid.

Teaching/Learning Activities:

Active Learning

Discussion (large/small group, online disc. board)

Labs/Computer Labs

Lecture

Assessment:

On-Line Delivery

- Assignments 30.00%

Frequency: 10-12
Description: Hands-on exercises using skills covered in previous lessons. Apply programming logic to solve small problems.
Outcomes Assessed: 1, 2, 3, 4, 5, 6
EES Assessed: 3, 4, 5, 6

- Quizzes 10.00%

Frequency: 10-12
Description: Multiple choice, true/false, matching questions and/or short answer questions based on previous lessons.
Outcomes Assessed: 1, 2, 3, 4, 5, 6
EES Assessed: 3, 4, 5, 6

- Test # 1 20.00%

Frequency: 1
Description: A combination of theory and practical test. The theory portion of the test is computer based and contains multiple choice, true/false, matching and short answer. During the practical portion of the test students will implement rules for preparing valid JSON and XML documents.
Outcomes Assessed: 2, 6
EES Assessed: 3, 4, 5, 6

- Test # 2 20.00%

Frequency: 1
Description: A combination of theory and practical test. The theory portion of the test is computer based and contains multiple choice, true/false, matching and short answer. During the practical portion of the test students will use simple SQL statements to modify/update information.
Outcomes Assessed: 2, 3, 4
EES Assessed: 3, 4, 5, 6

- Test#3 20.00%

Frequency: 1
Description: A combination of theory and practical test. The theory portion of the test is computer based and contains multiple choice, true/false, matching and short answer. During the practical portion of the test students will implement rules for data normalization and query the information in multiple tables.
Outcomes Assessed: 1, 4, 5

EES Assessed: 3, 4, 5, 6

100%

Note: The assessment listed in this outline represents the planned assessment method for this course. Unanticipated conditions during the delivery of the course may necessitate changes to the planned assessment. Students will receive reasonable advance notice should any changes be necessary.

Grading:

A = 80 - 100%
B = 70 - 79%
C = 60 - 69%
D = 50 59%
F = Less than 50%

Course Content:

See Embedded Knowledge and Skills (EKSs)

"Academic misconduct, including cheating of any form, will not be tolerated. Consequences may include, but are not limited to, a warning, a grade of "0" on the assignment/test/examination, or a failing grade in the course."

(Code of Students Rights and Responsibilities: Section 7.1.6)

All students and employees of this College have a right to study and work in an environment that is free from harassment and discrimination.

Accommodation Statement

The College will provide supports and services to all students with disabilities, both temporary and permanent, with valid supporting documentation. Interim accommodation requests will be received in good faith and can be provided pending receipt of medical documentation. Retroactive accommodations will be considered based on the unique circumstances of the individual matter. The College will give all Human Rights Code-related requests for accommodation meaningful consideration.

Procedure: The student is responsible to meet with a counsellor in Accessibility Services to discuss their functional limitations and accommodation needs and provide Accessibility Services with supporting documentation. Students are not required under the Ontario Human Rights Code to disclose their disability diagnosis (with the exception of Learning Disabilities) to receive accessibility supports and services and/or academic accommodations. Students are encouraged to meet with a counsellor prior to the start of a semester to provide information and arrange accommodations.