

**SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY**

**SAULT STE. MARIE, ONTARIO**



Sault College

**COURSE OUTLINE**

**COURSE TITLE:** **DATABASE MODELING**

**CODE NO. :** **CSD210** **SEMESTER:** 3

**PROGRAM:** **Computer Programmer/Programmer Analyst**

**AUTHOR:** **Dennis Ochoski**

**DATE:** **Aug/2009** **PREVIOUS OUTLINE DATED:** **Aug/2008**

**APPROVED:**

“B. Punch”

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CHAIR

\_\_\_\_\_  
DATE

**TOTAL CREDITS:** **5**

**PREREQUISITE(S):** **CSA102**

**HOURS/WEEK:** **4**

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*For additional information, please contact Brian Punch, Chair,*  
*School of Natural Environment/Outdoor Studies, & Technology Programs*  
*(705) 759-2554, Ext. 2681*

**I. COURSE DESCRIPTION:**

This course will emphasize the importance of database design prior to implementation. The student will learn to capture and model the user's data environment through the analysis and design of relational databases using the Entity-Relationship Model and normalization techniques. Database models will be physically implemented using a relational DBMS and SQL (Structured Query Language). To understand the database development process, the following concepts will be discussed: conceptual model, logical model, entities, attributes, relationships, cardinalities, primary and foreign keys, normalization, and data integrity.

**II. TOPICS TO BE COVERED:**

1. Database Processing vs Spreadsheet/Traditional File Processing.
2. Data Modelling and Design with the Entity-Relationship Model.
3. The Relational Model and Normalization.
4. Transforming E-R Model Designs into a Physical Implementation.
5. Data Definition and Manipulation using SQL.

### III. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course the student will demonstrate the ability to:

1. Understand the problems with spreadsheet/file processing systems and how database oriented systems provide solutions to those problems.  
(chapter 1- Kroenke and Auer)

This learning outcome will comprise approximately **5%** of the course.

***Elements of the performance:***

- define/describe the following terms:
 

i) database	iii) data redundancy
ii) database management system	iv) data integrity
- compare database processing with spreadsheet/file processing
- understand the disadvantages of spreadsheet/file processing
- understand the advantages and disadvantages of database processing
- identify and describe the functions of a database management system
- identify the role of various components of a database system

2. Understand the Relational Database Model and apply the Entity-Relationship Model for modelling business data requirements. (chapter 4 – Kroenke and Auer)

This learning outcome will comprise approximately **55%** of the course.

***Elements of the performance:***

- relate this course to systems analysis and design
- define and apply the concepts of the following terms:
 

i) Entity-Relationship Model	vii) internal/physical model
ii) entity	viii) weak entity
iii) attribute	ix) category types
iv) relationship	x) supertypes/subtypes
v) external/user view (subschemas)	xi) cardinality
vi) conceptual/logical model (schema)	xii) domain
- understand the importance for data modelling and design tools and techniques

- identify and name entities in a user's environment

***Elements of the performance(cont'd):***

- differentiate between an entity type and entity occurrence
- allocate attributes to their respective entities
- differentiate entity occurrences by assigning primary/unique identifiers to those occurrences
- understand how entities and relationships are represented
- understand and apply connectivities and cardinalities
- understand and apply the following types of relationships

i) one-to-one    ii) one-to-many    iii) many-to-many

- understand how "user views" are related and combined to form an overall database design
- use Microsoft Visio to create E-R diagrams (data models)

3. Understand anomalies and the need for normalization through application of the Relational Model.  
(chapter 2 – Kroenke and Auer)

This learning outcome will comprise approximately **20%** of the course.

***Elements of the performance:***

- define and apply the concepts of the following terms:

i) relation/row/column	v) functional dependency
ii) attribute	vi) determinant
iii) normal forms	vii) primary key/foreign key/candidate key
iv) modification anomalies	viii) referential integrity

- understand anomalies and the need for normalization
- understand how to assign primary keys to tables
- determine the functional dependencies among attributes
- understand the goal of domain key normal form
- compose relations applying the concepts of normalization and functional dependencies

4. Transform E-R data models into a physical relational design and perform data manipulation. (chapters 3 and 5, Appendix B – Kroenke and Auer)

This learning outcome will comprise approximately **20%** of the course.

***Elements of the performance:***

- create tables from the entities defined in the E-R Model and the list of attributes assigned to those entities
- define primary and secondary keys for each table
- implement one-to-one, one-to-many, and many-to-many relationships, and, explain how these relationships facilitate the retrieval of information
- enforce referential integrity constraints
- query a database retrieving row and column data (SELECT...)
- query a database using conditions to restrict the data retrieved (SELECT....WHERE...)
- rename column headings in the retrieved data
- use aggregate functions such as AVG, COUNT, MIN, MAX, and SUM
- organize data into groups (GROUP BY)
- set conditions on groups (HAVING)
- create queries involving two or more tables using both “joins” and “subqueries”
- insert data into a table (INSERT)
- update data in a table (UPDATE)
- delete data from a table (DELETE)

#### IV. REQUIRED RESOURCES/TEXTS/MATERIALS

Texts: Database Concepts  
4<sup>th</sup> edition, by David Kroenke and David Auer  
Pearson Publishing  
ISBN-13: 9780136086536

Software: MySQL GUI Tools Bundle for 5.1,  
free download from <http://dev.mysql.com/downloads/gui-tools/5.1.html>

## V. EVALUATION PROCESS/GRADING SYSTEM:

The grade for this course will be arrived at as follows:

Tests/Assignments	Outcome	Weight
Assignment #1 (modeling)	#2	3%
Assignment #2 (modeling)	#2	5%
Test #1	#1 and #2	20%
Assignment #3 (modeling)	#2	7%
Assignment #4 (modeling)	#2	8%
Test #2	#2	20%
Assignment #5 (normalization)	#3	5%
Test #3	#3	15%
Assignment #6 (SQL)	#4	3%
Assignment #7 (SQL)	#4	4%
Test #4	#4	<u>10%</u>
		100%

The following semester grades will be assigned to students in postsecondary courses:

Grade	Definition	Grade <i>Point Equivalent</i>
A+	90 – 100%	4.00
A	80 – 89%	4.00
B	70 – 79%	3.00
C	60 -- 69%	2.00
D	50 – 59%	1.00
F (Fail)	below 50%	0.00

CR (Credit)	Credit for diploma requirements has been awarded.
S	Satisfactory achievement in field /clinical placement or non-graded subject area.
U	Unsatisfactory achievement in field/clinical placement or non-graded subject area.
X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a

DATABASE MODELING  
COURSE NAME

CSD210  
COURSE CODE

	course.
NR	Grade not reported to Registrar's office.
W	Student has withdrawn from the course without academic penalty.

## VI. SPECIAL NOTES

### Course Outline Amendments:

The professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

### Retention of Course Outlines:

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

### Prior Learning Assessment:

Students who wish to apply for advance credit transfer (advanced standing) should obtain an Application for Advance Credit from the program coordinator (or the course coordinator regarding a general education transfer request) or academic assistant. Students will be required to provide an unofficial transcript and course outline related to the course in question. Please refer to the Student Academic Calendar of Events for the deadline date by which application must be made for advance standing.

Credit for prior learning will also be given upon successful completion of a challenge exam or portfolio.

Substitute course information is available in the Registrar's office.

### Disability Services:

If you are a student with a disability (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Disability Services office. Visit Room E1101 or call Extension 2703 so that support services can be arranged for you.

DATABASE MODELING  
COURSE NAME

CSD210  
COURSE CODE

Communication:

The College considers **WebCT/LMS** as the primary channel of communication for each course. Regularly checking this software platform is critical as it will keep you directly connected with faculty and current course information. Success in this course may be directly related to your willingness to take advantage of the **Learning Management System** communication tool.

The professor reserves the right to use other tools and / or techniques that may be more applicable. These other tools and / or techniques for effective communication will be discussed, identified and presented throughout the delivery of the course content.

Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Code of Conduct*. A professor/instructor may assign a sanction as defined below, or make recommendations to the Academic Chair for disposition of the matter. The professor/instructor may (i) issue a verbal reprimand, (ii) make an assignment of a lower grade with explanation, (iii) require additional academic assignments and issue a lower grade upon completion to the maximum grade “C”, (iv) make an automatic assignment of a failing grade, (v) recommend to the Chair dismissal from the course with the assignment of a failing grade. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Student Portal:

The Sault College portal allows you to view all your student information in one place. **mysaultcollege** gives you personalized access to online resources seven days a week from your home or school computer. Single log-in access allows you to see your personal and financial information, timetable, grades, records of achievement, unofficial transcript, and outstanding obligations, in addition to announcements, news, academic calendar of events, class cancellations, your learning management system (LMS), and much more. Go to <https://my.saultcollege.ca>.



DATABASE MODELING  
COURSE NAME

CSD210  
COURSE CODE

Electronic Devices in the Classroom:

Students who wish to use electronic devices in the classroom will seek permission of the faculty member before proceeding to record instruction. With the exception of issues related to accommodations of disability, the decision to approve or refuse the request is the responsibility of the faculty member. Recorded classroom instruction will be used only for personal use and will not be used for any other purpose. Recorded classroom instruction will be destroyed at the end of the course. To ensure this, the student is required to return all copies of recorded material to the faculty member by the last day of class in the semester. Where the use of an electronic device has been approved, the student agrees that materials recorded are for his/her use only, are not for distribution, and are the sole property of the College.

Attendance:

Sault College is committed to student success. There is a direct correlation between academic performance and class attendance; therefore, for the benefit of all its constituents, all students are encouraged to attend all of their scheduled learning and evaluation sessions. This implies arriving on time and remaining for the duration of the scheduled session. *It is the departmental policy that once the classroom door has been closed, the learning process has begun. Late arrivers may not be granted admission to the room.*

Absences due to medical or other unavoidable circumstances should be discussed with the professor. Students are required to be in class on time and attendance will be taken within the first five minutes of class. A missed class will result in a penalty in your marks unless you have discussed your absence with the professor as described above. The penalty depends on course hours and will be applied as follows:

Course Hours	Deduction
5 hrs/week (75 hrs)	1.0% /hr
4 hrs/week (60 hrs)	1.5% /hr
3 hrs/week (45 hrs)	2.0% /hr
2 hrs/week (30 hrs)	3.0% /hr

Absentee reports will be discussed with each student during regular meetings with Faculty **Mentors**. Final penalties will be reviewed and assessed at the discretion of the professor.

Other Pertinent Information

DATABASE MODELING  
COURSE NAME

CSD210  
COURSE CODE

1. In order to pass this course the student must obtain an overall quiz average of **50%** or better, as well as, an overall assignment/project average of **50%** or better. A student who is not present to write a particular quiz, and does not notify the professor beforehand of their intended absence, may be subject to a zero grade on that quiz.
2. There will be **no** supplemental or make-up quizzes/tests in this course.
3. Late assignment submissions will normally be given a mark of zero. Late assignments will only be marked at the discretion of the professor in cases where there were extenuating circumstances.
4. Any assignment submissions deemed to be copied may result in a **zero** grade being assigned to **all** students involved in that particular incident.
5. The professor reserves the right to modify the assessment process.