SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE:	**DATABASE MODELING**
CODE NO. :	**CSD210** **SEMESTER:** 3
PROGRAM:	**Computer Programmer/Programmer Analyst**
AUTHOR:	**Dennis Ochoski**
DATE:	**Sept/2011** **PREVIOUS OUTLINE DATED:** **Sept/2010**
APPROVED:	"Penny Perrier" June/11

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                            CHAIR   **DATE**

TOTAL CREDITS:	**4**
PREREQUISITE(S):	**CSA102**
HOURS/WEEK:	**4**

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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.

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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 (subschema)	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

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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)

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IV.   REQUIRED RESOURCES/TEXTS/MATERIALS

The specific book information for this course text is as follows:

Title: <u>Database Concepts</u>,
                    5th Edition, by David Kroenke and David Auer
                    Pearson Publishing
ISBN-13:   978-0-13-801880-1

Option 1: Purchase a subscription to a digital copy (eBook).
The student can purchase a web version or a downloadable version. The most common subscription timeframe is <u>180 days</u> but this varies depending on the text, publisher and/or web site. After the subscription timeframe has expired, the student no longer can access the text unless they extend/renew the subscription. If the bookstore offers an e-version of the text, the subscription timeframe is unlimited, but the subscription cost may be greater.
The advantages of the eBook version over the hardcopy version are twofold: savings of approximately 40% – 60%, and, no physical text to carry.

eBook Links: 1)   http://www.coursesmart.com/9780131377493?__professorview=false
                      2) see student portal for availability of e-book version from bookstore (bookstore offers an "unlimited" timeframe on subscriptions)

eBook Help: http://support.coursesmart.com/ics/support/default.asp?deptID=8070&task=knowledge&folderID=53

Option 2: Purchase a hardcopy.

The student may choose to purchase a hardcopy of the text from the above sites or from the bookstore.

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

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V.   EVALUATION PROCESS/GRADING SYSTEM:

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

Evaluation Methods	Weight
Quizzes	10%
Tests	60%
Assignments/Labs	30%
	100%

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

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

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VI.   OTHER EVALUATION CONSIDERATIONS

1.   In order to pass this course the student must obtain an overall test/quiz average of **50%** or better, as well as, an overall assignment average of **50%** or better. A student who is not present to write a particular test/quiz, and does not notify the professor beforehand of their intended absence, may be subject to a zero grade on that test/quiz.

2.   There will be **no** supplemental or make-up quizzes/tests in this course.

3.   Assignments must be submitted by the due date according to the specifications of the professor. Late assignments 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/projects submissions, deemed to be copied, will result in a **zero** grade being assigned to **all** students involved in that particular incident.

5.   It is the responsibility of the student to ask the professor to clarify any assignment requirements.

6.   The professor reserves the right to modify the assessment process to meet any changing needs of the class.

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VII.   **SPECIAL NOTES**

Communication:
The professor reserves the right to use tools other than **WebCT/LMS ,** such as
Microsoft Outlook, for the primary channel of communication.

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 enclosed, 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. Final penalties will be
reviewed and assessed at the discretion of the professor.

VIII.   **COURSE OUTLINE ADDENDUM:**

The provisions contained in the addendum located on the portal form part
of this course outline.