SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY
SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE: DATABASE MANAGEMENT AND DESIGN

CODE NO.: CET301 SEMESTER: FALL 96

PROGRAM: COMPUTER ENGINEERING TECHNOLOGY

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DATE: JUNE 1996 PREVIOUSLY DATED: JUNE 1995

APPROVED: _____ 96 06 11
DEAN DATE

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TOTAL CREDITS: 6

PREREQUISITE(S): The two year Technician Diploma or permission granted by the Dean.

I. **COURSE DESCRIPTION:** This course focuses on the data modelling skills required to effectively design and implement database-oriented systems.

The course begins with a study of the necessary terminology and concepts to gain an appreciation of databases/database management systems. Data modelling and design skills are developed by defining logical relationships among entities using the Entity-Relationship Model, and defining objects using the Semantic Object Model.

Practical skills are developed through the study and use of MicroSoft Access, a relational database management system. Case studies will be used to illustrate the analysis, design, and implementation of a database system.

II. **TOPICS TO BE COVERED:**

1. Database Processing vs Traditional File Processing.
2. Data Modelling with the Entity-Relationship Model.
3. Data Modelling with the Semantic Object Model.
4. The Relational Model and Normalization.
5. Database Design Using the E-R Model and Semantic Object Model.
6. Data/Database Administration.
7. Database Implementation with MicroSoft Access.

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III. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

A. Learning Outcomes:

	Approx. % of Course Grade
1. Understand the problems with traditional file processing systems and how database oriented systems provide solutions to those problems.	10%
2. Apply the Entity-Relationship Model for modelling business data requirements.	24%
3. Apply the Semantic Object Model for modelling business data requirements.	18%
4. Understand anomalies and the need for normalization through application of the Relational Model.	23%
5. Transform E-R data models and Semantic Object data models into relational, DBMS-independent designs.	5%
6. Understand the importance of data/database administration's role in an organization.	5%
7. Create databases in MicroSoft Access applying the concepts and techniques studied throughout the course.	15%
	100%

B. 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 traditional file processing systems and how database oriented systems provide solutions to those problems.
(chapters 1 and 2 - Kroenke)

Elements of the performance:

- define or describe the meanings of the following terms:

i)	database	v)	schema
ii)	database management system	vi)	subschema
iii)	data redundancy	vii)	internal view
iv)	data integrity		

- compare database processing with 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. Apply the Entity-Relationship Model for modelling business data requirements.
(chapter 3 - Kroenke)

Elements of the performance:

- relate this course to systems analysis and design
- define or describe the meanings of the following terms:

i)	Entity-Relationship Model	vi)	conceptual model
ii)	entity	vii)	logical model
iii)	relationship	viii)	physical model
iv)	cardinality	ix)	recursive relationship
v)	view	x)	subtype/supertype

Elements of the performance(cont'd):

- understand the importance for data modelling and design tools and techniques
- 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 "pieces" of a database design come together to form the overall design
- demonstrate the use of E-R diagrams to build a data model

3. Apply the Semantic Object Model for modelling business data requirements. (chapter 4 - Kroenke)

Elements of the performance:

- define or describe the meanings of the following terms:

  i) Semantic Object Model iv) property
  ii) object v) domain
  iii) object diagram

- define and illustrate the six basic types of semantic objects
- demonstrate the use of object diagrams to build a data model
- compare the Entity Relationship Model to the Semantic Object Model

4. Understand anomalies and the need for normalization through application of the relational Model.
(chapter 5 - Kroenke)

Elements of the performance:

- define or describe the meanings 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
- compose relations applying the concepts of normalization and functional dependencies

5. Transform E-R data models and Semantic Object data models into relational, DBMS-independent designs.
(chapters 6 and 7 - Kroenke)

Elements of the performance:

- define or describe the meanings of the following terms:

  i) tree structure ii) simple network iii) complex network

- understand how trees, simple networks and complex networks are represented in the Relational Model
- transform E-R models into relational designs
- transform Semantic Object models into relational designs

6. Understand the importance of data/database administration's role in an organization. (chapter 15 - Kroenke)

Elements of the performance:

- understand the importance and role of data/database administration in managing organizational resources
- understand how project level data administration activities support the development of a database system
- understand how system level database administration functions are used to successfully management a database environment
- understand what skills data/database administration requires and why it needs a balance of people, technical, and business skills to carry out its roles effectively
- understand the complexity involved in managing a database environment and how computer-based tools can be used to support data/database administration activities
- understand the management issues involved in initiating, staffing, and locating data administration in the organization

7. Create databases in MicroSoft Access incorporating the concepts and techniques studied throughout the course.
(chapters 1 to 5 - Grauer & Barber)

Elements of the performance:

- create a database
- add, edit, and delete records to a table within a database
- discuss the importance of data validation and how it is implemented in Access
- distinguish between a bound control, an unbound control, and a calculated control, and, explain how each type of control is entered on a form
- modify an existing form to include a combo box, command buttons, and colour
- describe the similarities between forms and reports with respect to bound, unbound, and calculated controls
- list the sections that may be present in a report and explain the purpose of each
- use the Query By Example (QBE) grid to create and modify a select query

Elements of the performance(cont'd):

- explain the use of multiple criteria rows within the QBE grid to implement And and Or conditions in a query
- define referential integrity and explain how its enforcement maintains consistency within a database
- explain how a subform is used in conjunction with a one-to-many relationship and use the Form Wizard to create a subform
- create a report based on a query
- create a main form containing two subforms linked to one another
- use the Cascade Update and Cascade Delete options in the Relationships window to relax enforcement of referential integrity
- create a main and a subform based on a query and discuss the advantage of using queries rather than tables as the basis for a form or report
- create a parameter query and explain how it can be made to accept multiple parameters
- use aggregate functions in a select query
- use the Import command to add external tables to an existing database

IV. EVALUATION METHODS:

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

Quizzes:	
outcome #1	10%
outcome #2	15%
outcome #3	10%
outcome #4	15%
outcomes #5, #6	10%
Assignments (3 @ 5%)	15%
Group Project	25%
Total	100%

The grading scheme used will be as follows:

A+	90 - 100%	Outstanding achievement
A	80 - 89%	Excellent achievement
B	70 - 79%	Average achievement
C	60 - 69%	Satisfactory achievement
R	Repeat	
X	Incomplete	A temporary grade limited to special circumstances that have prevented the student from completing the objectives by the end of the semester. An X grade reverts to an R grade if not upgraded within a specified time period.

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V. ASSIGNMENT/PROJECT SPECIFIC INFORMATION

1. Assignments/Projects will be assigned to student "project teams", each consisting of two or three students.

2. It is the responsibility of the project team to clarify any system requirements with the instructor.

3. At various intervals, the instructor will require each project team to report on the progress made on their respective assignment/project. At that time, each team member will be required to complete a Peer Evaluation Form used to "grade" each team member's contribution to the project. A sample of the evaluation form is attached.

4. At the completion of a project, the respective project team will present and demonstrate the functionality of their system to the instructor.

5. The grade assigned to the overall assignment/project and to each team member will be determined using three sources:

    a) Peer Evaluation Form
    b) Presentation of project to instructor(s)

** Note: When a project is presented to the instructor, each team member will be required to demonstrate his/her assigned task(s). The project will receive an overall grade and each team member will receive an individual grade which may or may not be equivalent to the overall project grade or to the grades of other team members.

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VI. SPECIAL NOTES

1. In order to pass this course the student must obtain an overall **quiz** average of 60% or better.

2. Assignments must be submitted by the due date according to the specifications of the instructor. Late assignments will normally be given a mark of zero. Late assignments will only be marked at the discretion of the instructor in cases where there were extenuating circumstances.

3. The instructor reserves the right to modify the assessment process to meet any changing needs of the class. Consultation with the class will be done prior to any changes.

4. The method of upgrading an incomplete grade is at the discretion of the instructor, and may consist of such things as make-up work, rewriting tests, and comprehensive examinations.

5. Students with special needs (eg. physical limitations, visual impairments, hearing impairments, learning disabilities) are encouraged to discuss required accommodations confidentially with the instructor.

6. Your instructor reserves the right to modify the course as he/she deems necessary to meet the needs of students.

VII. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advanced credit in the course should consult the instructor.

VIII. REQUIRED STUDENT RESOURCES

Texts: DATABASE PROCESSING: Fundamentals - Design - Implementation, 5th edition,
by David Kroenke
Prentice Hall Publishing

EXPLORING MICROSOFT ACCESS, Version 2.0,
by Robert Grauer and Maryann Barber
Prentice Hall Publishing

Peer Evaluation

Please rate each member of your group, INCLUDING yourself, on the items listed below using the following scale.

5 - Excellent
4 - Above Average
3 - Average
2 - Below Average
1 - Poor
0 - Non-participative

Item	Member 1 Name	Member 2 Name	Member 3 Name	Member 4 Name
Overall Attitude				
Attendance at Meetings				
Doing Required Work				
Doing Extra Work				
Helping Others With Work				
Problem Solving				
Knowledge Contribution				
Totals				

Comments: _____

You must also provide a list of specific tasks performed by **yourself**. These tasks include such things as database design/modelling, programming, writing user's guide, etc. Indicate your percentage contribution to each task. (ie. If you participated in the creation of a particular report, you may have felt that your contribution was 40% and other members contributed to the remaining 60%).

TASK	**% CONTRIBUTION**

COMMENTS:

YOUR NAME: _____