

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



Sault College

COURSE OUTLINE

COURSE TITLE: **DATABASE DESIGN AND IMPLEMENTATION I**
CODE NO. : **CSD204** **SEMESTER:** 3
PROGRAM: **PROGRAMMER(2090)/PROGRAMMER ANALYST(2091)**
AUTHOR: **Dennis Ochoski**
DATE: **Aug, 2004** **PREVIOUS OUTLINE DATED:** **Aug, 2003**
APPROVED:

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	DEAN	DATE
TOTAL CREDITS:	<u>5</u>	

PREREQUISITE(S): **CSA101**
HOURS/WEEK: **4**

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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 through methods used to properly identify entities in the user's environment, define logical relationships among those entities, and to properly assign attributes to those entities.

Practical modelling skills are developed through the study and use of the Entity-Relationship Model. In order to understand the transition from the conceptual design to the physical design, the student will implement their conceptual design using MySQL as the DBMS platform and SQL as the implementation language. A case study will be used to illustrate the analysis, design, and implementation of a database system

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 using MySQL Server.
5. Data 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- Rob & Coronel)

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. (chapters 2, 3 and 4 – Rob & Coronel; Appendix A on CD)

This learning outcome will comprise approximately **40%** 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	viii) weak entity
ii) entity	ix) subtype/supertype
iii) attribute	x) category types
iv) relationship	xi) domain
v) external/user view (subschema)	xii) cardinality
vi) conceptual/logical model (schema)	
vii) internal/physical model	

Elements of the performance(cont'd):

- understand the importance for data modelling and design tools and techniques
- identify and name entities in a user's environment
- 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 to build a data model

3. Understand anomalies and the need for normalization through application of the Relational Model.
(chapter 5 – Rob & Coronel)

This learning outcome will comprise approximately **25%** 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. (chapter 6 – Rob & Coronel; MySQL Tutorial text)

This learning outcome will comprise approximately **30%** 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 surrogate 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
- enforce minimum cardinalities for child and parent
- represent weak, id-dependent and weak, non-id-dependent relationships
- represent subtype and category relationships
- represent recursive relationships
- define and implement 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 a join between two tables
- 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 Systems: Design, Implementation, & Management
6th edition, by Peter Rob & Carlos Coronel Thomson Publishing
ISBN: 0-619-21323-x

MySQL Tutorial by Luke Welling & Laura Thomson Pearson Publishing
ISBN: 0-672-32584-5

Web Site References: www.mysql.com
www.mysql.com/documentation/index.html

V. EVALUATION PROCESS/GRADING SYSTEM:

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

Outcome	Quizzes	Assignments	Total
outcome #1:	5%	0%	5%
outcome #2:	5%	5%	
	10%	5%	
	10%	5%	40%
outcome #3:	5%	5%	
	10%	5%	25%
outcome #4:	10%	5%	
	<u>10%</u>	<u>5%</u>	<u>30%</u>
	65%	35%	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)	49% and below	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.

VI. SPECIAL NOTES:

Special Needs:

If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Special Needs office. Visit Room E1101 or call Extension 493 so that support services can be arranged for you.

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.

Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Rights and Responsibilities*. Students who engage in “academic dishonesty” will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program, as may be decided by the professor/dean. 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.

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.

Other Pertinent Information

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

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

VII. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advanced credit in the course should consult the professor. Credit for prior learning will be given upon successful completion of a challenge exam or portfolio.

VIII. DIRECT CREDIT TRANSFERS:

Students who wish to apply for direct credit transfer (advanced standing) should obtain a direct credit transfer form from the Dean's secretary. Students will be required to provide a transcript and course outline related to the course in question.