SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY
SAULT STE MARIE, ON

# COURSE OUTLINE

Course Title: Database Design and Implementation I

Code No.: CSD204 Semester: 3

Program: Computer Programmer/Programmer Analyst

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Date: Sep 2000 Previous Outline Date: Sep 1999

Approved: _____ _____
Dean Date

Total Credits: 6
**Prerequisites: CSA101**
Hours/Week: 4

DATABASE DESIGN AND IMPLEMENTATION I — CSD204
COURSE NAME — COURSE CODE
(Modified on: 03/27/07 by FST)

## I. COURSE DESCRIPTION:

This course is to provide students the opportunity to study database fundamentals as well as investigate a variety of approaches to database management. A study of database management theory will parallel the application of the theory in lab projects.

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The course will focus 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, define logical relationships among entities, and to properly assign attributes to entities.

Practical skills are developed through the study and use of the Entity-Relationship Model and the Semantic Object Model. Case studies will be used to illustrate the analysis, design, and implementation of a database system.

## II. 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.**

***Potential elements of the performance:***

- define or describe the meanings of the following terms:
  - i) database
  - ii) database management system
  - iii) data redundancy
  - iv) data integrity
  - v) schema
  - vi) subschema
  - vii) internal view
- compare database processing with file processing
- define the disadvantages of traditional file processing
- define 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

**II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE(Continued):**

***This learning outcome will constitute approximately 10% of the course grade (possible weighting strategy) and take approximately 2 weeks.***

**Resources:**

**Textbook: Chapters 1 and 2**
**Professor's handouts, guidance, lab exercises and material**

**2. Apply the Entity-Relationship Model for modelling business data requirements.**

***Potential 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) | conceptual model |
| ii) | entity | viii) | logical model |
| iii) | attribute | ix) | physical model |
| iv) | relationship | x) | recursive relationship |
| v) | cardinality | xi) | subtype/supertype |
| vi) | view | | |

- describe the importance for data modelling and design tools and techniques
- appreciate how entities and relationships are represented
- apply connectivities and cardinalities
- and apply the following types of relationships
  i) one-to-one ii) one-to-many iii) many-to-many
- describe how "user views" are related and combined to form an overall database design
- demonstrate the use of E-R diagrams to build a data model

***This learning outcome will constitute approximately 30% of the course grade (possible weighting strategy) and take approximately 5 weeks.***

**Resources:**

**Textbook: Chapters 3**
**Professor's handouts, guidance, lab exercises and material**

## II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE(Continued):

### 3. Apply the Semantic Object Model for modelling business data requirements.

***Potential elements of the performance:***

- define and apply the concepts of the following terms:
  - i) Semantic Object Model
  - ii) object
  - iii) object diagram
  - iv) property
  - v) object property
  - vi) non-object property
  - vii) multi-valued property
  - viii) domain
- define and illustrate the six basic types of semantic objects
- demonstrate the use of object diagrams to build a data model

***This learning outcome will constitute approximately 15% of the course grade (possible weighting strategy) and take approximately 2 weeks.***

**Resources:**

**Textbook: Chapters 4**
**Professor's handouts, guidance, lab exercises and material**

### 4. Demonstrate anomalies and the need for normalization through application of the Relational Model.

***Potential elements of the performance:***

- define and apply the concepts of the following terms:
  - i) relation/row/column
  - ii) attribute
  - iii) normal forms
  - iv) modification anomalies
  - v) functional dependency
  - vi) determinant
  - vii) primary key/foreign key/candidate key
  - viii) referential integrity
- define anomalies and the need for normalization
- describe the various forms of keys and how to assign primary keys to tables
- define and determine the functional dependencies among attributes
- compose relations applying the concepts of normalization and functional dependencies

***This learning outcome will constitute approximately 25% of the course grade (possible weighting strategy) and take approximately 4 weeks.***

## II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE(Continued):

**Resources:**
**Textbook: Chapters 5**
**Professor's handouts, guidance, lab exercises and material**

**5. Transform E-R data models and Semantic Object data models into a physical relational design using Microsoft Access.**

***Potential elements of the performance:***

- define and apply the concepts of the following terms:
  i) tree structure ii) simple network iii) complex network
- describe how trees, simple networks and complex networks are represented in the Relational Model
- transform E-R models into physical relational designs
- transform Semantic Object models into physical relational designs
- create a Microsoft database and create its appropriate tables

***This learning outcome will constitute approximately 20% of the course grade (possible weighting strategy) and take approximately 3 weeks.***

**Resources:**
**Textbook: Chapters 6 & 7**
**Professor's handouts, guidance, lab exercises and material**

## III. TOPICS TO BE COVERED:

- **NOTE: These topics sometimes overlap several areas of skill development and are not necessarily intended to be explored in isolated learing units or in the order below:**

| TOPICS | APPROXIMATE TIME |
|---|---|
| 1. Database Processing vs Traditional File Processing | 2 Weeks |
| 2. Data Modelling with the Entity-Relationship Model | 5 Weeks |
| 3. Data Modelling with the Semantic Object Model | 2 Weeks |
| 4. The Relational Model and Data Normalization | 4 Weeks |
| 5. Physical Design using Microsoft Access | 3 Weeks |

## IV. REQUIRED RESOURCES / TEXTS / MATERIALS:

**Textbook to be used as reference material:**

1. **"Database Processing" by David Kronke, Prentice Hall, Seventh Edition**

**Additional Resource Materials**

Additional reference material will either be given to the students or placed in the library for the student's use.
Handouts, guidance, and material as it relates to the individual topics.
Use of research modes such as INTERNET, library database searches and articles.

## IV. EVALUATION METHODS:

| | |
|---|---|
| Tests and Quizzes | 60% |
| Assignments and Lab work | 40% |

The tentative breakdown is as follows:

| | |
|---|---|
| Formal Theory Tests (4 @ 15%) | 60 %: |
| Assignments (4 @ 5%) | 20% |
| Assigned Group Projects (2 @ 10%) | 20% |
| Total | 100% |

Some minor modifications to the above percentages may be necessary. The professor reserves the right to adjust the mark up or down 5% based on attendance, participation, leadership, creativity and whether there is an improving trend.

- All assignments must be completed satisfactorily to complete the course. Late hand in penalties will be 5% per day. Assignments will not be accepted past one week late unless there are extenuating and legitimate circumstances.
- The professor reserves the right to adjust the number of tests and quizzes based on unforeseen circumstances. The students will be given sufficient notice to any changes and the reasons thereof.
- A student who is absent for 3 or more times without any valid reason or effort to resolve the problem will result in action taken.

Note: If action is to be taken, it will range from marks being deducted to a maximum of removal from the course.

## IV. EVALUATION METHODS (Continued):

### ASSIGNMENT/PROJECT SPECIFIC INFORMATION

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

2. It is the responsibility of the project team to clarify any system requirements with the user/professor.

3. At various intervals, the instructor will require each assignment/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 assignment/project.

4. At the completion of an assignment/project, the respective assignment/project team will present and demonstrate the functionality of their system to the user/professor.

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 professor(s)

** Note: When an assignment/project is presented to the professor, each team member may be required to demonstrate his/her assigned task(s). The assignment/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 assignment/project grade or to the grades of other team members.
    a) Peer Evaluation Form
    b) Presentation of project to professor(s)

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## IV. EVALUATION METHODS (Continued):

### GRADING DETAILS:

1. TESTS

Written tests will be conducted as deemed necessary; generally at the end of each block of work. They will be announced about one week in advance. Quizzes may be conducted without advance warning.

2. ASSIGNMENTS

Assignments not completed by the assigned due-date will be penalised by 5% per day late. All assignments must be completed satisfactorily to complete the course.

3. GRADING SCHEME

| Grade | | Definition | Grade Point Equivalent |
|---|---|---|---|
| A+ | 90 - 100% | Outstanding achievement | 4.00 |
| A | 80 - 89% | Excellent achievement | 3.75 |
| B | 70 - 79% | Average Achievement | 3.00 |
| C | 60 - 69% | Satisfactory Achievement | 2.00 |
| R | Repeat | | 0.00 |
| U | Incomplete: | Course work not complete at Mid-term. Only used at mid-term. | |
| X | A temporary grade that is limited to instances where special circumstances have prevented the student from completing objectives by the end of the semester. An X grade must be authorised by the Chairman. It reverts to an R if not upgraded in an agreed-upon time, less than 120 days. | | |

4. UPGRADING OF INCOMPLETE

When a student's course work is incomplete or final grade is below 60%, there is the possibility of upgrading to a pass when the student's performance warrants it. Attendance and assignment completion will have a bearing on whether upgrading will be allowed. A failing grade on all tests will remove the option of any upgrading and an R grade will result. The highest grade on re-written tests or assignments will be 60%. Where a student's overall performance has been consistently unsatisfactory, an R grade may be assigned without the option of make-up work.

The method of upgrading is at the discretion of the teacher and may consist of one or more of the following options: assigned make-up work, re-doing assignments, re-writing of tests, or writing a comprehensive supplemental examination.

## VI. SPECIAL NOTES

1. All students should be aware of the Special Needs Office in the College. If you have any special needs such as being visually impaired, hearing disabled, physically disabled, learning disabilities you are encouraged to discuss required accommodations confidentially with the Professor and/or contact the Special Needs Office, Room E1204, Ext. 493, or 717, or 491 so that support services can be arranged for you.

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

3. It is the responsibility of the student to retain all course outlines for possible future use in gaining advanced standing at other post-secondary institutions.

4. Plagiarism

   Student should refer to the definition of "academic dishonesty" in the "Statement of 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, as may be decided by the professor/dean.

5. Substitute course information is available at the Registrar's office.

6. Students must achieve a passing grade in **both** the assignment and the test portions of the course.

7. The topics will not necessarily be covered in the order shown in this course outline.

## VII. PRIOR LEARNING ASSESSMENT

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

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## 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.

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