SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: DATABASE MANAGEMENT

Course No.: CET301

Program: COMPUTER ENGINEERING

Semester: 5

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APPROVED: L P Chaput 93-01-08

Chairperson Date

DATABASE MANAGEMENT **CET301**

C O U R S E O U T L I N E

LENGTH OF COURSE: 5 HOURS PER WEEK

I. PHILOSOPHY/GOALS

This course is to provide students the opportunity to study database processing fundamentals as well as investigate a variety of approaches to database management.

A study of database management system theory will parallel the application of the theory in lab projects. VAX/RDB will be studied as a representative Relational Database system. Both SQL and RDO data manipulation languages will be covered. The students will also apply their knowledge of the CDD (Common Data Dictionary) to centralize data definitions for the systems they will create. Where relevant, Fortran will be used as the application language to access the database from within user programs.

A series of related assignments will apply the principles learned in each section. In some cases, analysis and modification of existing databases will be used as the basis of assignments. In other cases, the design and implementation of new systems will be required.

II. STUDENT PERFORMANCE OBJECTIVES

At the end of this course the student will:

1. Understand the concept of Database Management.
2. Understand the different components of a Database Management System.
3. Understand Database terminology.
4. Appreciate and implement proper Database Design.
5. Design build and modify Database Applications.

III. TOPICS TO BE COVERED

1. Overview of Database Processing
2. Components of Database Processing Systems
3. Database Development
4. Entity-Relationship Model
5. Semantic Object Model
6. Relational Model and Normalization of Data
7. Database Design
8. Learning to use Both RDO and SQL
9. Hierarchical Databases and IMS
10. Data Administration and Database Administration
11. Resource Sharing and Client-Server Architecture
12. Distributed Database Processing

IV. LEARNING ACTIVITIES / REQUIRED RESOURCES

In this course a student will develop an understanding of the following objectives and be able to apply this knowledge to specific tasks as outlined below. (Some minor modifications to these objectives may be required if time constraints apply)

BLOCK 1 INTRODUCTION TO DATABASE CONCEPTS

1. Identify the nature of database processing and file processing.

2. Understand the limitations of traditional file processing.

3. Understand the difference between flat files and non-flat files.

4. Understand the advantages and disadvantages of database processing.

5. Identify and describe the functions of a database management system.

6. Identify and describe the role of the various components of a database system.

7. Describe what a Data Base Management System (DBMS) is.

8. Identify and understand the different functions of a Generic DBMS.

9. Identify the different types of DBMS's (Hierarchical versus Relational).

10. Understand the differences between a Hierarchical DBMS and a Relational DBMS.

11. Describe what a Database application is?

12. Understand the subsystems of a DBMS. Namely:
    a) the DBMS engine
    b) the Definition Tools SubSystem
    c) the Processing Interface Subsystem
    d) the Application Development Tools Subsystem
    e) the Data Administration Subsystem
    f) the Data Dictionary Subsystem

13. Define and understand the terms schema, sub-schema, logical view, physical view.

14. Identify the elements in the VAX Information Architecture and where they are appropriately applied.

BLOCK 2 DATABASE STRUCTURES AND THE RELATIONAL MODEL

1. Understand the concept of the physical properties of data as it relates to defining objects and domains.

2. Understand the terms:
   a) relations
   b) normalization
   c) modification anomalies
   d) keys (and how to apply them in database definition)
   e) attributes
   f) functional dependencies
   g) Uniqueness

3. Understand the differences between the First through Fifth Normal Forms of Data.

4. Understand the following Attribute relationships:
   a) One-to-one
   b) Many-to-one
   c) Many-to-many

5. Understand compatible and noncompatible unions, differences and intersections of data.

6. Understand the three types of binary relationships between records and how they are combined in trees, simple networks and complex networks.

7. Understand the process of database design and implementation.

8. Understand the role of a DBA, Data Base Administrator in the management of a database.

BLOCK 3 VAX/RDB RELATIONAL DATABASE MANAGEMENT SYSTEM

1. Understand the elements of DML: RDB Data Manipulation Language and how to use it to store, modify, and erase data in a Database.

3. Be able to use advanced DML.

4. Understand how to use Fortran programs to access RDB databases to create viable applications.

5. Understand the process of Rdb database design and creation.

6. Be able to use the CDD, the Common Data Dictionary effectively.

BLOCK 4 RELATIONAL PROCESSING with SQL

1. Understand the significance of SQL as a data manipulation language.

2. Understand the concept of table processing with SQL.

3. Be able to use SQL selections and SQL functions in conjunction with RDB.

V. REQUIRED STUDENT RESOURCES

TEXTBOOKS:

"Database Processing - Fundamentals, Design, Implementation" by David Kroenke
(4TH Edition, MACMILLAN)

USING SQL -

VAX/RDB NOTES
Course notes supplied by the Instructor

VI. SPECIAL NOTES

1. Students with special needs are encouraged to discuss required accommodations confidentially with the instructor.

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

VII. ASSESSMENT

The final mark in the course will be arrived at as follows:

Tests and quizzes	60%
Assignments	40%

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

* - All assignments must be completed satisfactorily to complete this 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.

GRADING SCHEME

1. TESTS

Written tests 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 penalized. All assignments must be completed satisfactorily to complete the course.

3. GRADING SCHEME

A+	90	-	100%	Outstanding achievement
A	80	-	89%	Excellent achievement
B	70	-	79%	Average Achievement
C	55	-	69%	Satisfactory Achievement

I Incomplete: Course work not complete at Mid-term. Only used at mid-term.

R Repeat

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 authorized 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 55%, 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 56%.

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.