



Course title: Databases (Modeling and SQL)

AEC Programming, Networks, and Security

AEC Programming and Web Technologies

AEC Integrating Information Systems

AEC Specialization in Programming for 2D-3D Video Games

Course code: 420-D06-SU

Total hours: (75 hours) 3-2-3

COURSE COMPENTANCES

- 0175 – Create and use databases
- Course requirement : D06

GENERAL OBJECTIVES

By the end of this course participants will be able to design and develop relational databases. Participants will also master the Structured Query Language (SQL), with the aim of implementing and operating databases.

SPECIFIC OBJECTIVES

Using Microsoft's ISQL/w server tool, students will be able to:

- model and normalize a database
- create database tables
- modify the structure of a database table
- insert, remove, and update data from a database table
- select and display data using the SELECT command
- use aggregate functions, as well as the aggregate functions native to Transact-SQL
- Recognize and utilize the different types of table joins.
- create nested queries
- create and use database views to simplify complex queries

Using the procedural language Transact-SQL, students will be able to:

- use both flow control and batch programming commands
- declare and use variables and constants
- create and execute stored procedures
- create and execute triggers

COURSE BREAKDOWN

Module 1 – Modernization

1.1 – A short history of data bases

What is a database?
The evolution of databases
Database terminology

1.2 – Modeling

The Entity-Relationship model
Primary and Foreign Keys
Referential Integrity
Relationships (1:1, 1:N, N:M)
Selecting a Primary Key

1.3 – Normalization

Normal forms (1FN, 2FN, and 3FN)

Module 2 – Relational Databases

- General concepts
- Data models and their application to databases
- Query Languages
- Example of a relational database

Module 3 – Microsoft SQL Server

- The client-server environment using SQL Server
- The relational database management system (SGBDR) using Microsoft's SQL Server 2000: its characteristics and components.
- The structured query language SQL (Transact-SQL using SQL Server)
- Presentation of ISQL/W

Module 4 – Transact-SQL : Data Manipulation Language (DML),

Part I – Querying Data

- The SELECT statement
- Aggregate functions
- Unions
- Natural joins

- External joins
- Subquery

Module 5 – Transact-SQL : Data Manipulation Language (DML), Part II – Modifying Data

- Modify data with SQL (INSERT, UPDATE, DELETE)

Module 6 – Transact-SQL : Data Definition Language (DDL)

- Creation of tables
- Creation of views
- Data Integrity

Module 7 – Indices (optional)

- Organization of storage
- Types of indices
- Optimization

Module 8 – Stored Procedures

- Advantages
- Execution of a stored procedure
- Parameters
- State after execution
- Optimization

Module 9 –Flow Control Instructions

- Local and global variables
- Flow control statements (IF..ELSE, BEGIN..END, WHILE, RETURN)

Module 10 – Transactions and Transaction Locking (optional)

- Definition of a transaction

Module 11 – Triggers (optional)

- Understanding SQL server triggers
- Using triggers
- Differences between triggers and stored procedures
- Examples of triggers

SUMMATIVE EVALUATION	METHODOLOGY
<ul style="list-style-type: none">• Exercises and homework : 10%• Practical work : 20%• Exams:<ul style="list-style-type: none">○ Exam (modeling) 20 %○ Midterm Exam (SQL) 20 %○ Final Exam (SQL) 30 %	<ul style="list-style-type: none">• Theoretical lectures• Practical course work

STANDARDS OF L'INSTITUT SUPÉRIEUR D'INFORMATIQUE

With the aim of ensuring a high quality of education and maintaining the smooth operation of our facilities, the following rules are applied:

ATTENDANCE:

If you miss more than 15% of class time for a course, you will expose yourself to a failing grade for the course, without the right to take a supplemental examination.

If you are absent on the day of an examination, you will receive 0% for this examination. Only the directors can authorize you to retake the examination on another day. A doctor's note is not necessarily a sufficient justification. Each case will be assessed on its own merits.

If you are late to class, you may be refused access to the class until the break. Three late arrivals or early departures as part of the same course will be counted as an absence.

EXAMINATIONS:

For courses involving practical projects and examinations, you must achieve at least 50% on the examinations in order for the practical projects to be graded.

The corrected examinations will be temporarily handed back to the students for consultation, and subsequently collected again by the instructor for archiving.

During examinations:

- It is forbidden to leave the classroom under any circumstances. If a student leaves the classroom, they must hand in their examination to the instructor, who will consider their examination to be finished.
- No documents, bags, or brief cases can be on the desks. Each student must be sure to clear their desk before the beginning of the examination. The instructor will ensure the application of this standard.
- The use of electronic devices, cell phones, or other devices is forbidden. Any violation of this standard will result in the immediate termination of the examination for the student.

PLAGIARISM:

Please note that any plagiarism or fraud, any attempt at plagiarism or fraud, any plagiarism or fraud cooperation, during a test or an examination, automatically leads to a zero (0).

PRACTICAL PROJECTS:

The practical projects must necessarily be done in teams of 2 or 3 people. A minimum of 5 hours could be added to the course hours for the practical projects; attendance during these periods is mandatory. In order for the final examination grade to be considered, the practical projects must be submitted before the final examination. The practical projects will be presented to the group by the instructor during the period following the examination.

GRADE REVIEW:

As specified in our PIEA (Politique institutionnelle d'évaluation des apprentissages), approved by the MEES (Ministère de l'Éducation et de l'Enseignement supérieur), if you wish to have a grade reviewed, you must submit a grade review request to the directors within ten (10) working days after the grades are submitted to the students or posted on the school's intranet.

SUPPLEMENTAL EXAMINATIONS:

You will be entitled to a supplemental examination for a course only if:

- a) you achieved a grade of at least 45% on all of the evaluations for the course,
- b) you were absent for less than 15% of the class time for the course,
- c) you submitted all examinations and practical projects for the course,

If these four conditions are not met, you will need to retake the course.

A supplemental examination replaces the regular examinations for the course. A grade of at least 50% must be obtained on the supplemental examination in order for the practical project to be considered.

Following a supplemental examination, the maximum final grade for the course will be 60%.

PREREQUISITES:

In order to have access to the final projects and internships, you must have successfully completed all of the courses in the program. Tuition fees must be fully paid before the internships.

FOOD:

It is strictly forbidden to drink, eat, or smoke outside of areas specifically reserved for these activities.

CELL PHONES AND LAPTOPS:

It is required to turn off your cell phone when you enter the college. It is forbidden to bring your own personal laptop to the college.