



COURSE OUTLINE

Course identification

Name of programs – Codes:	COMPUTER SCIENCE TECHNOLOGY - PROGRAMMING (420.BP) INFORMATION TECHNOLOGY PROGRAMMER- ANALYST (LEA.3Q)
Course title:	DATABASES II
Course number:	420-BD2-AS
Total number of course hours:	60 Hours
Weighting:	2-2-2
Statement of the competency – Code:	Use a database management system- 00Q7

Contribution of the course in the program

Course position

This course is located in the second semester of the *Information Technology Programmer-Analyst* (LEA.3Q) and in the third semester of the *Computer Science technology – Programming* (420.BP) program. Its duration is 60 hours divided into 30 hours of theory and 30 hours of exercises plus approximately 30 hours of homework. In both programs this course finalizes and shares the development of the 00Q7 competency with *Databases I* (420-BD1-AS) given in the first semester for (LEA.3Q) and in the second semester for (420.BP).

In all programs, *Databases I* (420-BD1-AS) is a prerequisite, given in the first semester for (LEA.3Q) and in the second semester for (420.BP). In all programs, this course is a prerequisite to *Web Server Applications Development* (420-DW3-AS) given in the third semester for (LEA.3Q) and in the fourth semester for (420.BP); *Web Server Applications Development II* (420-DW4-AS) given in the fourth semester for (LEA.3Q) and in the fifth semester for (420.BP) and finally *Trends in Technology* (420-TT4-AS) given in the fourth semester for (LEA.3Q) and in the sixth semester for (420.BP).

Scope of the course

During this course, the student will learn advanced database programming topics using primarily Oracle PL/SQL programming language. He acquires the deep programming techniques on the objects of the database server. First, he learns how to perform tests and loops on data of the database. Then, he deepens his programming techniques by creating and managing several types of modules stored in the database. Also, throughout his learning, he learns to detect and manage errors of the program.

Upon completion of this course, the student will be able to manipulate data of the database using different types of cursors. He will also be able to efficiently create and use stored modules in the database such as procedures, functions and packages. He will also be able to build programs allowing a dynamic management of data. In addition, the student will be able to handle program errors using

exceptions and to ensure and control data consistency using database triggers.

Course components (objective and standard of the competency)

Expected outcomes (achievement context of the competency)

The achievement context of this competency will reflect the conditions as they occur in the following settings: academic, professional, work, or life environment.

- For a relational or other type of database management system
- Based on the data model and specifications of the database management system

Throughout the course, you will engage in various learning situations/activities so that by the end of the course, you will have met the expected outcomes.

Elements and performance criteria

The elements of an objective formulated in terms of the competency specify its essential components. They include only what is necessary in order to understand and master the competency. If the competency is described as a process, the elements are the steps for execution.

The performance criteria are the specific pre-established requirements upon which you and your teacher can objectively judge your development of the targeted competency. They are part of the description of this competency. They are prescriptive.

Sometimes an element appears in more than one course. If this is the case, a number indicates its complexity level: level one (1) being the simplest, level two (2), average, and level three (3), advanced, at the ministerial level.

Below are the elements of the competency and performance criteria for this course that are to be respected:

Competency: Use a database management system - 00Q7

General ministerial and institutional performance criteria:

- Autonomy
- Critical thinking
- Sense of organization

<i>Elements of the competency 420.BP (2-3-4 only)</i>	<i>Performance criteria specific to each element</i>
1. Create the database	1.1 Accurate analysis of the data model 1.2 Accurate analysis of the specifications of the database management system 1.3 Appropriate coding of the instructions for creating the database
2. Formulate read requests, insertion requests, modification requests and deletion requests.	2.1 Accurate identification of the types of requests to be formulated 2.2 Appropriate use of clauses, operators, commands and parameters 2.3 Appropriate use of regular expressions 2.4 Proper performance of requests

3. Ensure data confidentiality and consistency	3.1 Accurate identification of the techniques to be used 3.2 Proper management of authorizations 3.3 Appropriate data encryption 3.4 Appropriate use of referential integrity constraints, triggers and transactions.
4. Program automated data processing operations.	4.1 Accurate identification of data processing operations to be automated 4.2 Appropriate creation of stored procedures and scripts 4.3 Clear record of programming support documentation
5. Save and restore the database.	5.1 Astute choice of techniques to be used for saving and restoring 5.2 Appropriate use of techniques for saving and restoring the database 5.3 Compliance with the procedure and frequency for saving the database

Course content/main themes

Listed below is the **essential** content to be covered in this course:

- Programming environment
 - Language vocabulary
 - Database server and PL/SQL engine interactions
 - Structure of PL/SQL bloc
 - Use of PL/SQL
- Data types
 - Simple and composite data types
 - Managing implicit cursor
- Tests and Loops structures
 - IF, CASE, LOOP, FOR and WHILE instructions
 - Managing DML commands and transactions
 - Use of sub-programs
- Explicit cursors
 - Static and variable cursor
 - For update cursor and cursor with parameters
 - Using explicit cursor attributes
- Stored procedures and functions
 - Creating, modifying and dropping stored procedure and function
 - Using stored procedures and functions (by name and by position)
 - Using of stored functions in an SQL command
- Exceptions
 - Handling predefined exceptions.
 - Managing user defined exceptions.

- Managing the exceptions PRAGMA EXCEPTION_INIT and RAISE_APPLICATION_ERROR
 - Package
 - Creating and manipulating objects in the package
 - Overloading procedures and functions.
 - Initializing the package
 - Managing exception using package
 - Database triggers
 - Types of triggers (insert, update, delete and instead of)
 - Creating, using and dropping triggers
 - Using of predicates and pseudo records :OLD and :NEW
 - Dynamic SQL
 - Benefits of dynamic SQL in PL/SQL block
 - Using dynamic SQL with DDL, DML and DQL commands
 - Dynamic SQL using DBMS_SQL package
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Learning activities

Provided below are examples of learning activities that correspond to the competency for this course. The learning activities are found in the course calendar that complements this course outline.

- Brain storming
 - Application exercises following demonstrations from the teacher
 - Case studies
 - Project
 - Situation problems
 - Group discussion
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Terms for Evaluating Learning

The evaluation of your learning is based on two inseparable methods: formative evaluation and summative evaluation. These two evaluation types are formal. Detailed information on the evaluation schedule is found in the course calendar, under the “Formative and summative evaluation schedule” column.

Formative evaluation

Following a learning activity or learning period, time is set aside for introspection. You will determine what has been understood and achieved and seek to identify the nature and origin of weak areas. These designated periods consist of simple means: short tests, association games, logbooks, a portfolio, questions, creating of samples, etc.

*Formative evaluation is frequent and covers as many aspects as possible. It takes place in class, individually or in groups, and leads to immediate decisions. **You are the one who assumes the bulk of the work during individual or group corrections, adjustments and other self-evaluation tasks. The purpose is not to determine grades.***

If you take the results of the formative evaluations seriously throughout the course, you will ensure preparedness for the summative evaluations. You will be able to make the necessary progress to acquire the targeted competency at the required level, according to the achievement context and pre-

established performance criteria.

Below are some examples of formative evaluation methods that correspond to the targeted competency for this course:

- Situation problems
- Case studies
- Feedback from the teacher after student's application exercises

Summative evaluation

Summative evaluations are less frequent. They take place later on, towards the middle and end of the semester. This gives you the time to integrate your learning and to learn how to apply it to situations related to the targeted competency. The summative evaluation material is prepared by your teacher according to the description of the course's targeted competency: its elements, achievement context and performance criteria.

The work completed in summative evaluations is graded. The purpose is to determine what you have learned.

Below is the information on the summative evaluation schedule and details for this course, as well as the weighting of marks:

<i>Evaluations</i>	<i>Weighting</i>
Mid-term Exam	30%
Project	30%
Final Exam	40%
Total	100 %

Institutional requirements

Student's commitment

By registering for this course, you commit to:

- *obtain the necessary course materials at the start of the semester;*
- *respect the copyright;*
- *participate in the learning activities, formative and summative evaluation activities outlined in the course calendar;*
- *complete the work assigned to you;*
- *submit the work on time.*

Teacher's commitment

Your teacher commits to:

- *create varied learning situations that enable you to put into practice the knowledge, actions and professional behaviour of the targeted competency;*
- *plan sufficient and appropriate formative evaluation activities, involving correction and improvement, that provide frequent feedback, allowing you to be well informed of your progress;*
- *provide summative evaluations that correspond to the course's targeted competency;*
- *evaluate work according to the applicable criteria, in a fair and equitable manner within a reasonable time.*

The Institutional Policy on Evaluating Learning (IPEL) is applied to all institutional programs. Listed below are a few of its clauses:

Written language (article 5.7)

The teacher is responsible for identifying spelling and grammar errors and for allocating the corresponding number of marks for any given summative evaluation.

Below is the % – based on language requirements – that can be attributed to each summative evaluation:

- *up to 10% for 420.BP and 5% for LEA.3Q*

Class attendance (article 5.12)

Attendance and participation in classes and evaluations are mandatory for all students.

The teacher has the responsibility of monitoring attendance and of evaluating the reasons justifying student absences from classes.

A student whose absences exceed the allowable number for the course could be denied access to the final exam for that course.

Plagiarism and fraud (article 5.16)

Plagiarism, attempted plagiarism or complicity in plagiarism during an assignment or any evaluated task contravenes the rules. This includes (but is not limited to):

- *the whole or partial presentation (reference, paraphrase, summary, translation, insertion) of the work of another (text, illustration, film, music, etc. on paper or online) as one's own, or failing to cite a source;*
- *the use of another student's exam during an exam;*
- *the use of an assignment done for another course or a project already submitted in the past, which is passed off as an original work.*

Fraud, attempted fraud or complicity in fraud constitutes an infraction.

This includes (but is not limited to):

- *the possession or use of any unauthorized document, material or equipment during an exam, including the use of technological tools;*
- *the execution of an evaluated task by another person;*
- *the substitution for another person during an exam, assignment or any evaluated task;*
- *the possession of the questions or answers of the exam;*
- *the obtainment of any aid not authorized in advance by the teacher.*

Plagiarism, attempts at plagiarism or fraud, or collaboration in plagiarism or fraud are prohibited and considered serious offences. Thus, any instances of plagiarism or fraud will lead to a grade of '0' for the assignment in question. In addition, a note will be made in the student's file and the student will receive a written notice from his or her Program Directorate to that effect.

In the case of recidivism, in the same course or in another course, the student will be given a grade of '0' for the course in question. A second note is made in the student's file and the student will receive a summons from his or her Program Directorate. For a third offence, he or she may be expelled from the College.

Submission of work and tests (article 5.8)

All assignments must be submitted in class at the time designated by the teacher. Any late submissions result in a grade of zero (0).

Upon presentation of an official supporting document or valid reason for the absence, the student may request an extension from the teacher, who may accept or refuse the student's work and apply a penalty for the lateness.

Program Directorates do not accept student work. Assignments must be submitted directly to the teacher.

Rules and regulations to follow

Late arrivals

The teacher may refuse to admit to the classroom any student arriving late. A late arrival is considered an absence for that period.

Note: Students arriving late must recognize that the information they missed will not be repeated. Late students are therefore responsible for asking their peers about the material they missed. Arriving after the break, as well as leaving before the end of the class, may result in one or more hours of absence.

Eating and drinking in class

Eating and drinking are prohibited in the classrooms, locker rooms and Documentation Centre. Food may only be eaten in the cafeteria, vending machine areas and student lounges.

Mandatory course material

- USB flash disk
 - Notebook for taking notes
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Bibliography for this course

Oracle. *Oracle Database 12c Release 2*

<https://docs.oracle.com/en/database/oracle/oracle-database/12.2/index.html>

GABILLAUD, Jérôme. *SQL Server 2014 - SQL, Transact SQL*. ENI, 2015

SAAD, Mohamed Fadhel. *PL/SQL sous Oracle 12c Guide du développeur*. ENI, 2016

Academic Studies Directorate approval: *Signature and date of approval*
