Database Security
Master –2nd year

Evaluation (grading) method – semester 1, 2025-2026

The grade at the course " Database Security" can be obtained through one of the following two methods:

- **Project** – The grade can be achieved by working on a (validated*) data model and implementing the concepts covered in the laboratories.

  OR

- **Application –** The grade can be obtained by integrating various aspects of database security in a practical application

*The validation of the model is just a recommendation. It means the model was corrected by a database teacher previously (if presented at another course's evaluation).

1. Grading formula

Based on the selected grading method, the grade will be calculated as it follows (the mentioned requirements are detailed in section 6 of this document):

1.1 Project

Grade = 1 point + N_1 + N_2 + N_3, where:

- N_1 = maximum 4 points, obtained from solving the requirement 1 and 4 requirements from the set 2-7, regardless of complexity. However, it is mandatory that the project is functional, meaning that the code must be implemented and capable of running successfully.
- N_2 = maximum 2 points, obtained from solving the remaining requirements from the set 2-7, excluding those from N1, regardless of complexity.
- N_3 = maximum 3 points, obtained from the complexity of the project (including how each requirement is treated, the level of difficulty, original and coherent examples, methods that have not been presented or worked on in the laboratory, etc.) and/or the preparation of an essay.

1.2 Application

Grade = 1 point + N_1 + N_2 + N_3, where:

- N_1 = maximum 4 points, obtained from the relevance of the application to the subject of the course, regardless of complexity. The application should intersect with a minimum of 3 project security requirements from 2-7 (or equivalent).

- N_2 = maximum 2 points, obtained from including at least 2 additional security requirements, other than those from N_1, regardless of complexity.
- N_3 = maximum 3 points, obtained from the complexity of the application (including the level of difficulty, functionality, methods that have not been presented or worked on in the laboratory related to the treated security aspect etc.).

2. Deadlines

- The choice of project/application will be announced through a form/assignment by **November 30, 2025**.
- The project/application must be uploaded no later than the aanounced deadline (which will be about **7 days prior to the exam date)**.
- **The presentation of the project/application** is mandatory and will take place on the scheduled exam date during the session. The presentation will follow the session's procedure (face-to-face). Non-attendance at the exam will result in a **failing grade**.

- The essay is optional and will only contribute to the complexity score. The option to write an essay will be announced through a form/assignment by **November 30, 2025**. The essay must be uploaded by **December 31, 2025**, and the presentation of the essay will take place during the course in the last 2 weeks of the semester.

3. Conditions for passing

- Achieving a grade of 5, according to the grading formula.
- The project/application/essay must be original, representing the student's own work.

4. Resit/Reexamination/Grade Improvement

- The same grading procedure applies, with a different deadline for submitting the project or the application.

5. System

- The database used or referred to in the project/application must be Oracle. The database used in the essay may not necessarily be *Oracle*.

6. Requirements

6.1 Project requirements

- The project will start with the conceptual diagram of a data model (the scenario will be chosen by the student). For designing this diagram, refer to the "Databases" courses (Computer Science, 1st Year).
- The structure of the project is as follows:

1. Introduction
    a. Brief presentation of the designed model and its rules
    b. Conceptual diagram
    c. Relational schemas
    d. Table creation (separate script)
    e. Presentation of the security rules to be applied to the model.
2. Data Encryption
3. Database activity Auditing
    a. Standard Auditing
    b. Audit Triggers
    c. Audit Policies
4. Management of Database Users and Computational Resources
    a. Designing the identity management configuration in the database (process-user, entity-process, entity-user matrices)
    b. Implementing the identity management configuration in the database
5. Privileges and Roles
    a. System and Object Privileges
    b. Privileges hierarchies
    c. Privileges on dependent objects
6. Database Applications and Data Security
    a. Application Context
    b. SQL Injection
7. Data Masking

6.2 Application Requirements

- The application will include relevant aspects related to the subject of the course.
- Please refer to the remarks in the grading formula for other details.

6.3 Essay Requirements (optional)

- The essay topics can be chosen from a list provided to the students or they can be proposed by the students themselves. The proposed topics must be relevant to the subject of the course.
- The essay must include an abstract, bibliographic references (citations within the text of the essay) and a bibliography.
- It is necessary to have a practical part in the essay, which can include implementation / illustrating the content with examples.

7. Eligibility Criteria

7.1 Project

- To be considered, the project must include:
  - a doc/docx/pdf file that integrates all the solutions to the requirements, including print screens demonstrating that all the code included in the project has been executed;
  - a text file containing the SQL code for generating the database (table creation commands and data insertion commands);
  - a text file containing the SQL code for the requirements from points 2-7; the requirements, expressed in natural language, should be indicated as comments within this file, preceding each SQL implementation.
- The above files should be named as follows: <Last_Name>_<First_Name>_group-<document_type>.<extension>, where *document_type* will have the values "project," "create_insert," "encryption," "audit," "identity_resource_mgmt," "privs_roles," "application_security," "data_masking" (for example: Popescu_Ana_510-project.docx, Popescu_Ana_510-create_insert.txt, Popescu_Ana_510-encryption.txt etc.). The files with these names should be uploaded **by the specified deadline**; the upload link will be announced on Teams/Moodle.

7.2 Application

- To be considered, the application must include:
  - a doc/docx/pdf file that provides a brief overview of the application and details the relevant aspects of the application in relation to the subject of the course, including print screens demonstrating the functionality of these relevant aspects;
  - a text file containing the database generation code (table creation commands and data insertion commands);
  - the application source code - either as an archive or a GitHub repository link.

- The above files should be named as follows: <Last_Name>_<First_Name>_group-<document_type>.<extension>, where *document_type* will have the values "application," "database," "source_code" (for example: Popescu_Ana_510-application.docx, Popescu_Ana_510-database.txt, Popescu_Ana_510-source_code.zip). The files with these names should be uploaded **by the specified deadline**; the upload link will be announced on Teams/Moodle.

7.3 Essay with a practical part (optional)

- To be considered, the essay must include:
  - A doc/docx/pdf file that constitutes the essay itself, which should include an abstract and bibliography. The rest of the sections will be decided by the student based on the topic being addressed. The document should also include print screens demonstrating the functionality of the practical part.
  - Text files containing the corresponding code for the practical part of the essay.
- The above files should be named as follows: <Last_Name>_<First_Name>_group-<document_type>.<extension>, where *document_type* will have the value "essay" and suggestive abbreviations for the code in the files or a simple numbering (for example: Popescu_Ana_505-essay.docx, Popescu_Ana_505-database.txt, Popescu_Ana_505-exemple_1.txt etc.). The files with these names should be uploaded by the specified deadline; the upload link will be announced on Teams/Moodle.