



DISCIPLINE ACADEMIC SHEET
ACADEMIC YEAR 2025 – 2026

1. PROGRAMME DATA

1.1. Higher Education Institution	UNIVERSITY OF CRAIOVA
1.2. Faculty	Automation, Computers and Electronics
1.3. Department	Computers and Information Technology
1.4. Field of Study	Computers and Information Technology
1.5. Study level	L(License / Undergraduate)
1.6. Organizational form	IF
1.7. Study Program (name/code) /Qualification	Computers / L2060101010

2. DISCIPLINE DATA

2.1 Discipline Name				Database Design			
2.2 Course Activities Holder				Prof. dr. Liana Stanescu			
2.3. Practical Activities Holder				Prof. dr. Liana Stanescu			
2.4. Study Year	4	2.5. Semester	1	2.6. Evaluation type	E	2.7. Discipline regime	DOP

3. ESTIMATED TOTAL TIME (hours per semester of teaching activities)

3.1. Number of hours per week	4	in which: 3.2 course	2	3.3. sem./lab./pr.	0/2/0
3.4. Total hours of curriculum	56	in which: 3.5 course	28	3.6. sem./lab./pr.	0/28/0
3.7. Time distribution - hours/week					hours
Study after manual, course support, bibliography and notes					25
Additional documentation in library, on specialized electronic platforms and field					10
Training seminars / labs, homework, portfolios and essays					10
Tutorial					10
Examinations					10
Other activities.....					4
Total hours per individual activities					69
3.8. Total hours per semester					125
3.9. Number of credits					5

4. PRECONDITIONS (where appropriate)

4.1. of curriculum	Databases, Object-Oriented Programming, Data Structures, Programming Techniques
4.2. of competence	•

5. CONDITIONS (where appropriate)

5.1. of the course	Teaching the course is done using the video projector. For some explanations and answers to questions the board is used. The
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	course support, power point presentation and electronic bibliography are provided
5.2. of seminar/ laboratory/project	MS Access, MS SQL Server

6. COURSE OBJECTIVES – expected learning outcomes that are supported by completing and passing the course

Knowledge	Student/Graduate: 1. The conceptual EER (Extended-Entity-Relationship) model and its transformation into a logical (relational) model. 2. Databases normalizations 3. Transactions Concepts 4. Databases security 5. Databases backup and Recovery techniques
Skills (Abilities)	Student/Graduate: 1. Creating EER diagrams and transforming them into relational schemas. 2. Identifying keys and defining integrity constraints. 3. Designing a properly normalized database. 4. Writing complex SQL queries: SELECT, JOIN, GROUP BY, HAVING, ORDER BY, DISTINCT. 5. Subqueries, related queries, aggregation expressions. 6. Insert, update, delete operations (INSERT, UPDATE, DELETE). 7. Creating and managing objects: tables, views, indexes, procedures, functions, triggers, cursors, packages
Responsibility and autonomy	Student/Graduate: 1. The student/graduate behaves honorably, responsibly, ethically, in accordance with the law to ensure the reputation of the profession.

7. CONTENT

7.1. Course	The method of implementation	Teaching methods	Allocated time (hours)
1. Enhanced Entity-Relationship and Object Modeling 1.1 Subclasses, Superclasses, and Inheritance 1.2 Specialization and Generalization 1.3 Constraints and Characteristics of Specialization and Generalization 1.4 Modeling of UNION Types Using Categories Formal Definitions for the EER Model	face to face	Videoprojector, classic	4
2. ER- and EER-to-Relational Mapping 2.1 Relational Database Design Using ER-to-Relational Mapping 2.2 Mapping EER Model Concepts to Relations	face to face	Videoprojector, classic	2

3. Functional Dependencies and Normalization for Relational Databases 3.1 Informal Design Guidelines for Relation Schemas 3.2 Functional Dependencies 3.3 Normal Forms Based on Primary Keys 3.4 General Definitions of Second and Third Normal Forms 3.5 Boyce-Codd Normal Form 3.6 Multivalued Dependencies and Fourth Normal Form	face to face	Videoprojector, classic	8
4. Practical Database Design and Tuning 4.1 The Role of Information Systems in Organizations 4.2 The Database Design Process 4.3 Physical Database Design in Relational Databases 4.4 An Overview of Database Tuning in Relational Systems 4.5 Automated Design Tools	face to face	Videoprojector, classic	2
5. Transaction Processing Concepts 5.1 Introduction to Transaction Processing 5.2 Transaction and System Concepts 5.3 Desirable Properties of Transactions 5.4 Schedules and Recoverability 5.5 Serializability of Schedules 5.6 Transaction Support in SQL	face to face	Videoprojector, classic	4
6. Concurrency Control Techniques 6.1 Locking Techniques for Concurrency Control 6.2 Concurrency Control Based on Timestamp Ordering 6.3 Granularity of Data Items and Multiple Granularity Locking	face to face	Videoprojector, classic	4
7. Database Recovery Techniques 7.1 Recovery Concepts 7.2 Recovery Techniques Based on Deferred Update 7.3 Recovery Techniques Based on Immediate Update 7.4 Database Backup and Recovery from Catastrophic Failures	face to face	Videoprojector, classic	2
8. Database Security and Authorization 8.1 Introduction to Database Security Issues 8.2 Discretionary Access Control Based on Granting/Revoking of Privileges 8.3 Mandatory Access Control for Multilevel Security	Face to face	Videoprojector, classic	2
Bibliography:			

Bibliography⁸

1. Fundamentals Of Database Systems, Ramez Elmasri, Shamkant B. Navathe, Addison-Wesley Publishing Company 2015
2. Principles of Database and Knowledge-Base Systems vol I, J.D. Ullman, Computer Science Press 1989
3. Baze de date, Burdescu D., Ionescu A., Stanescu L., Editura Universitaria, Craiova, 2004
4. <https://docs.oracle.com/en/database/oracle/oracle-database/26/sqlrf/Introduction-to-Oracle-SQL.html>
5. Database Design, Addrienne Watt, 2014, <https://opentextbc.ca/dbdesign01/>
6. <https://docs.oracle.com/en/database/oracle/oracle-database/19/lnpls/index.html>
7. Database Design and Implementation, Weiru Chen, 2023, https://orc.library.atu.edu/cgi/viewcontent.cgi?article=1002&context=atu_oer

7.2. laboratory	The method of implementation	Teaching methods	Allocated time (hours)
1. Oracle Apex Administration	face to face	Videoprojector, clasic	2
2. Oracle 10g Express/ Queries	face to face	Videoprojector, clasic	4
3. PL/SQL-Introduction;Variables	face to face	Videoprojector, clasic	2
4. PL/SQL – Control structures	face to face	Videoprojector, clasic	2
5. PL/SQL- Simple and Composed Data Types	face to face	Videoprojector, clasic	2
6. PL/SQL-Record Data Type	face to face	Videoprojector, clasic	2
7. PL/SQL-Cursors	face to face	Videoprojector, clasic	2
8. PL/SQL-Triggers	face to face	Videoprojector, clasic	2
9. PL/SQL-Stored Procedures	face to face	Videoprojector, clasic	4
10.PL/SQL-Functions	face to face	Videoprojector, clasic	2
11. PL/SQL- Packages	face to face	Videoprojector, clasic	2
12. PL/SQL-Transactions	face to face	Videoprojector, clasic	2

8. Correlating the content of the discipline with the expectations of representatives from the epistemic community, professional associations and representative employers in the field related to the program

The topics covered by the course were discussed with representative employers in the field related to the program: Operative, NetRom Software, Empact

9. EVALUATION

Activity Type	9.1. Evaluation criteria	9.2. Evaluation methods	9.3. Final mark weight
9.4. Course	- Knowledge of the necessary models (extended entity-relationship model and relational model) for the design of relational databases. - Knowledge of the rules for mapping the extended	Exam: written test Exam requirements: Perform all laboratory work and get a note ≥ 5 on the lab evaluation. The written test will contain 3 problems and 1 theory topic.	- the note will be composed of: $N = 0.6 * N1 + 0.4 * N2$ Where: N1 = written exam grade N2 = the grade obtained on the lab activity

	entity-relationship model to the relational model. - Knowledge of relational database and PL/SQL language - Ability to make connections between the notions taught - Ability to correctly apply theoretical notions in the design and implementation of concrete situations		- the two grades counting on the final mark must be over 5, being scored from 1 to 10.
9.5. Laboratory	L: Knowledge of Oracle Server functions for creating and managing relational databases. Knowledge of PL/SQL commands for managing stored procedures, functions, triggers.	Presentation at the end of each laboratory of how to meet the requirements of laboratory work	The student will enter the final exam if he has properly performed the tasks of each laboratory work and obtain $N2 \geq 5$
9.6. Minimum standard of performance			
The student enters the final exam, if he has adequately fulfilled the tasks of each laboratory, obtained the mark for the $N2 \geq 5$, and the minimum exam graduation criterion is to get the final mark $N \geq 5$.			

Date of Completion	Signature of the Course Activities Holder,	Signature of the Practical Activities Holder,
23.08.2025		

Date of Approval in the Department	Signature of the Department Director,
25.08.2025	Ș.l.dr.ing. Nicolae ENESCU

Date of Approval in the Faculty	Signature of the Dean,
	Prof.dr.ing. Dorin ȘENDRESCU