INTRODUCTION TO DATABASES (DATABASES I)

1. GENERAL

SCHOOL			
ACADEMIC UNIT			
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	ICE-4001	**SEMESTER**	4th
COURSE TITLE	INTRODUCTION TO DATABASES – DATABASES I		

INDEPENDENT TEACHING ACTIVITIES if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures	3	
Tutorials	1	
	4	**5**

COURSE TYPE general background, special background, specialised general knowledge, skills development	Basic Level in the domain. Skill development.
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTIONS and EXAMINATIONS:	English
IS THE COURSE OFFERS TO ERASMUS STUDENTS	Όχι
COURSE WEBSITE (URL)	

1. LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area
- Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B
- Guidelines for writing Learning Outcomes

The course introduces the area of database systems. It discusses and motivates their application in real life scenarios. At the gist of the course, we will tackle modeling issues and the translation of models that are based on business requirements into relational tables that can be deployed on Relational Data Management Systems (DBMS). We will introduce the basics of querying databases and, in particular we will see the syntax and composition of SQL queries. The course will include a design and implementation of a real database system and in this way it will lead to the course "Advanced Databases".

Upon successful completion of the course, student will have obtained the following:
- Knowledge of the basic tools and DBMSs,
- Collection and analysis of basic business rules and requirements for designing a database,

- Knowledge of the basic techniques to design of a database in a DBMS,
- Knowledge of the syntax and use of the SQL language for designing and querying a database,
- Knowledge of basic notions related to transactions, database administration and view management,
- Project work in groups with other collagues of theirs for the design, implementation and presentation of a case study using SQL within a DBMS.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	Project planning and management
	Respect for difference and multiculturalism
	Respect for the natural environment
Adapting to new situations	Showing social, professional and ethical
Decision-making	responsibility and sensitivity to gender issues
Working independently	Criticism and self-criticism
Team work	Production of free, creative and inductive thinking
Working in an international environment	......
Working in an interdisciplinary environment	Others...
	....
Production of new research ideas	

- Individual work
- Group work with the use of necessary technologies
- Project design, management and presentation

2. SYLLABUS

1. Introduction to Datbases, Database Management Systems, Architecture of Database Management Systems.
2. Data Structures for databases. Clasical database models (e.g. hierarchical, graph). Relational data model. Relational algebra. Relational calculus and Query by Example (QBE).
3. Database modeling. Conceptual models. Entity Relationship (ER) model.
4. Logical design of relational databases. Normalization. Functional Dependencies and normalization.
5. Database languages. SQL language and the SQL3 standard.
6. View definition and managemet. View updates.
7. Database administration. Θέματα διαχείρισης και λειτουργίας βάσεων δεδομένων. Database Integrity, optimization, redesign, security, tuning etc.
8. The role and responsibilities of a Database Administrator (DBA).
9. Transaction management.
10. Files systems and database physical design. Introduction to the physical design and organization of a DBMS.

3. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face-to-face lectures, Distance learning
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	• Use of advanced Database Management Systems: Oracle, mySQL. • Use of the university online platform in Course Teaching, Use of ICT in Laboratory Teaching, Use of ICT in the communication with students and student assessment.

TEACHING METHODS	Activity	Semester workload
The manner and methods of teaching are described in detail. Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.	Lectures	39
	Tutorials	13
	Group work on a case study to implement a DB inside a DBMS using SQL.	30
	Individual study	43
The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS	**Course Total Hours** (25 ώρες φόρτου εργασίας ανά πιστωτική μονάδα)	**125**

STUDENT PERFORMANCE EVALUATION	I. Final written exam (70%), which includes:
Description of the evaluation procedure Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other Specifically-defined evaluation criteria are given, and if and where they are accessible to students.	- Multiple-choice questions - Problems to be solved (short-answer questions) - Theoretical questions II. Group work (within the framework of turotial exercises) (30%) All evaluation crietiria are posted on the online pages of the course (e-class).

4. ATTACHED BIBLIOGRAPHY

- Suggested bibliography :
1. Hector Garcia-Molina, Jeffrey Ullman, Jennifer Widom, Database Systems: The Complete Book, 2008, ISBN: 978-0131873254, Pearson; 2nd edition.
2. Elmasri Ramez, Navathe Shamkant, Fundamentals of Database Systems, 2016, ISBN: 978-0133971118, Pearson; 7th edition.
3. Ramakrishnan Raghu, Gehrke Joahannes, Database Management Systems, 2012, ISBN: 978-0072465631, McGraw-Hill; 3rd edition.
4. Silberschatz A., Korth H.F., Sudarshan S., Database System Concepts, 2010, ISBN: 978-0073523323, McGraw-Hill; 6th edition.

- Research papers and technical reports from projects, chapters from diploma theses, review papers and other publications in hot topics withing the area of databases and their techniques.