1. GENERAL

SCHOOL	SCHOOL OF ENGINEERING		
ACADEMIC UNIT	DEPARTMENT OF ELECTRONICS ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
ΚΩΔΙΚΟΣ ΜΑΘΗΜΑΤΟΣ	2605011	**SEMESTER**	5
COURSE TITLE	DATA STRUCTURES AND MANAGEMENT		
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 credit*		**WEEKLY TEACHING HOURS**	**CREDITS (ECTS)**
Lectures		2	3
Practice		2	
COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Degree-Specific Course (SPC)		
PREREQUISITE COURSES:	NONE		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	NO		
COURSE WEBSITE (URL)	http://www.electronics.teipir.gr/index.php/en/2016-02-01-10-11-06/2016-02-01-10-12-32/undergraduate-curriculum/5th-semester		

2. 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*

Upon successful completion of this course module, students possess advanced knowledge, skills and competences in the subject of Data Structures and Management that enable them to :

- Analyze, design and implement data structures aiming the optimum solution of complex programming projects
- Analyze the requirements of business data and rules
- Apply data base design methodology and tools (ER and UML models)
- Utilize relational algebra and relational calculus as theoretical tools for the information extraction in a relational database
- Understand semantic modeling
- Understand the convergence of computing and networking technologies for the efficient information representation
- Use SQL and its subsets (DDL and DML) for the denotation of logic schema and query execution in a real environment
- Develop database applications with the use of appropriate software tools and object oriented programming languages.

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*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Working independently
- Team work
- Production of free, creative and inductive

3. COURSE CONTENT

1. Fundamental data structures and implementation methods.
2. Databases: Introductory concepts, advantages, models, abstraction levels, design procedure.
3. RDBMS: Introductory concepts, internal structure, management issues.
4. ER and UML models: Introductory concepts, methodology and design tools.
5. Database relational model: Relations, integrity constraints, queries, views, transformation from an ER model, normalization issues.
6. Relational algebra and relational calculus.
7. SQL: Definition and execution, integrity constraints, queries and views.
8. Physical schema design, security policy and RDBMS application development.
9. Representation techniques (human readable/machine readable) and information organization (graphs, distributed dictionaries).
10. Data management in Information Centric Networks.
11. NoSQL databases and web services.
12. Ontologies and graph databases.

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to face, Distance learning, etc.*	Face to face lectures
USE OF INFORMATION AND	• Use of electronic presentation with multimedia

<table>
<tr><td>COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td>content in class,
• Student support through the course webpage and the departmental e-learning platform,
• Electronic communication of instructors and students, through the course webpage and by e-mail.</td></tr>
<tr><td>TEACHING METHODS
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.

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</td><td>Lectures, Laboratory experiments, project and study.

<table><tr><th>Activity</th><th>Semester workload (hours)</th></tr><tr><td>Lectures</td><td>52</td></tr><tr><td>Study for lectures</td><td>26</td></tr><tr><td>Study and preparation for exams</td><td>12</td></tr><tr><td>Course Total</td><td>90</td></tr></table></td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION
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..</td><td>The evaluation includes a midterm exam or a project (30%) and a final exam (70%).

The midterm exam or the project topic is given in the middle of the semester. The final exam is comprehensive and is given at the end of the semester.

Student evaluation is performed in the language of instruction.</td></tr>
</table>

5. ATTACHED BIBLIOGRAPHY

Essential reading

1. Harvey Deitel and Paul Deitel, *Java: How to Program*, Prentice Hall, 2009, (8th Edition).
2. R. Ramakrishnan and J. Gehrke, *Database Management Systems*, McGraw-Hill, 2002 (3rd Edition).

Recommended Books

1. R. Elmasri and S.B. Navathe, *Fundamentals of Database Systems*, Addison Wesley Higher Education, 2007.

2. S. Sahni, *Data Structures, Algorithms and Applications in C++,* McGraw-Hill, 1998 (2nd Edition).

3. M. A. Weiss, *Data Structures and Problem Solving using JAVA,* Pearson Education , 2012 (3rd Edition).