COURSE OUTLINE

(1) GENERAL

<table>
<thead>
<tr>
<th>SCHOOL</th>
<th>SCHOOL OF ENGINEERING</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACADEMIC UNIT</td>
<td>COMPUTER ENGINEERING AND INFORMATICS</td>
</tr>
<tr>
<td>LEVEL OF STUDIES</td>
<td>Undergraduate</td>
</tr>
<tr>
<td>COURSE CODE</td>
<td>CEID_ΝΥ334</td>
</tr>
<tr>
<td>SEMESTER</td>
<td>FALL (5th)</td>
</tr>
<tr>
<td>COURSE TITLE</td>
<td>DATABASE SYSTEMS</td>
</tr>
</tbody>
</table>

INDEPENDENT TEACHING ACTIVITIES

<table>
<thead>
<tr>
<th>Activity</th>
<th>Weekly Teaching Hours</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures, Laboratory Exercises, Recitation sections</td>
<td>2X3X2</td>
<td>7</td>
</tr>
</tbody>
</table>

Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).

COURSE TYPE

general background, specialised general knowledge, skills development

PREREQUISITE COURSES:

There are no prerequisite courses. It is however recommended that students have at least a basic knowledge of Data Structures, Algorithms and Programming.

LANGUAGE OF INSTRUCTION and EXAMINATIONS:

Greek. Instruction may be given in English if foreign students attend the course.

IS THE COURSE OFFERED TO ERASMUS STUDENTS:

YES

COURSE WEBSITE (URL)

http://www.dblab.upatras.gr/gr/DBI.htm
https://eclass.upatras.gr/courses/CEID1124/

(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

At the end of this course the student will:

1. Have acquired basic knowledge in database systems and data management concepts and understand the issues that are specific to the efficient implementation of such systems.
2. Have understood the basic concepts of data models and the operations of each data model.
3. Have acquired experience with SQL, QBE and other query languages.
4. Be able to understand the various storage strategies and access methods and implement efficient data management systems.
5. Be able to apply the theory of database design in designing real systems.

Competences

At the end of the course the student will have further developed the following skills/competences:

1. Ability to understand the various concepts and basic principles of database management systems, and how these concepts are interrelated with the performance of working systems.
2. Ability to apply these concepts in order to design and implement efficient database
management systems.
3. Ability to work cooperatively in order to solve problems that arise during the development of a full-fledged working software system.
4. Studying abilities that are needed for continuous professional development.

**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 | Others… |
| Production of new research ideas | …… |

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Team work
Project planning and management
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Production of free, creative and inductive thinking

(3) **SYLLABUS**

- Database System Architecture: data abstraction; external, conceptual, and internal schema; data independence; data definition and data manipulation languages.
- Data models: Entity-relationship and relational data models; data structures, integrity constraints, and operations for each data model; relational query languages: SQL, algebra, calculus, QBE.
- Theory of database design: Functional dependencies; normal forms; dependency preservation; information loss.
- Storage Strategies: Indices, B-trees, hashing. Advanced access methods: advanced hashing and multi-key access methods.
- Data stream management systems. Study of current database systems.

The work in the database systems laboratory aims at the understanding and practical application of the design and implementation procedures of the relational DBMSs using MySQL. The laboratory is divided into 4 modules: (1) Requirements analysis and DB design (ER diagram, relational schema), (2) Creating a DB (create, insert), (3) DB queries (select, update, delete), Programming in DBMSs (triggers, stored procedures). The laboratory is done through lectures followed by laboratory exercises. It concludes with the design of a full-scale DB, creating tables and importing data via appropriate SQL statements, SQL queries implementation, and building an application in Java to communicate with the DB, retrieve data and update data.
**DELIVERY**

Face-to-face, Distance learning, etc.

**USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**

Use of ICT in teaching, laboratory education, communication with students.

We use Information and Communications Technology in communicating with students. We use e_class, e_mail, forum. The course has a web site.

**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.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Semester workload</th>
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<tbody>
<tr>
<td>Lectures</td>
<td>26</td>
</tr>
<tr>
<td>Laboratory Practise</td>
<td>39</td>
</tr>
<tr>
<td>Recitation</td>
<td>26</td>
</tr>
<tr>
<td>Project</td>
<td>26</td>
</tr>
<tr>
<td>Report writing</td>
<td>26</td>
</tr>
<tr>
<td>Study and analysis of bibliography</td>
<td>52</td>
</tr>
<tr>
<td><strong>Course total</strong></td>
<td><strong>195</strong></td>
</tr>
</tbody>
</table>

**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.

(1) Written examination (60% of the final grade)
(2) Laboratory exercises (32% of the final grade)
(3) Project (8% of the final grade)

**ATTACHED BIBLIOGRAPHY**

- Suggested bibliography:


- Related academic journals: