

INSTITUTION	NATIONAL AND KAPODISTRIAN UNIVERSITY OF ATHENS																			
SCHOOL	SCHOOL OF SCIENCE																			
DEPARTMENT	INFORMATICS AND TELECOMMUNICATIONS																			
COURSE LEVEL	UNDERGRADUATE																			
COURSE TITLE	Data Structures																			
COURSE CODE	K08	Semester	2	ECTS	7															
TEACHING HOURS per week	THEORY	4	SEMINAR.	1	LABORATORY	1														
COURSE TYPE	<p>Select one of the following and delete the rest</p> <p>Compulsory (YM)</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>K</th> <th>E1</th> <th>E2</th> <th>E3</th> <th>E4</th> <th>E5</th> <th>E6</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;"> </td> <td style="text-align: center;"> </td> <td style="text-align: center;"> </td> <td style="text-align: center;"> </td> <td style="text-align: center;"> </td> <td style="text-align: center;"> </td> </tr> </tbody> </table> <p>Fill the table as in the curriculum: Track (A-Computer Science, B- Computer Engineering) / Specialization Compulsory (Y) / Core Specialization (B)/ Elective Specialization (E)</p>						K	E1	E2	E3	E4	E5	E6							
K	E1	E2	E3	E4	E5	E6														
URL	http://cgi.di.uoa.gr/~k08																			
EXPECTED PRIOR KNOWLEDGE/ PREREQUISITES AND PREPARATION:	K04																			
TEACHING AND EXAMINATIONS LANGUAGE:	GREEK																			
THE COURSE IS OFFERED TO ERASMUS STUDENTS	YES																			

COURSE CONTENT
Basic programming knowledge using the C language (pointers, structures, linked data representations). Recursion. Modularity and data abstraction. Stacks. Queues. Algorithm analysis. Lists and strings. Trees and expression trees. Heaps. Binary search trees. AVL trees. M-way trees. 2-3 trees. 2-3-4 trees. B-trees. Red black trees. Hashing. Disjoint sets. Graphs and graph algorithms. Sorting.

STUDENT LEARNING OBJECTIVES

Upon successful completion of the course the student will be able to:

- develop modular programs that use abstract data types
- develop recursive programs
- solve problems by using the appropriate data structures
- compute the complexity of used algorithms
- analyze the performance of various data structures to solve given problems

TEACHING AND LEARNING METHODS – ASSESSMENT

TEACHING METHOD	In Class (Face to Face)																
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES	Email communication Live transmission of lectures Ability to track recorded lectures Utilization of educational platform https://piazza.com for answering student questions and making announcements etc.																
TEACHING ORGANIZATION	<p><i>Describe in detail the way and methods of teaching:</i> Enhanced Lectures, Online Lectures, Seminars, Tutorial, Laboratory, Laboratory Exercise, Study & analysis of literature, Practice (Positioning), Interactive teaching, Developing a project, Individual / group work Telework (reference to tools) etc.</p> <p><i>Details of the student's study hours for each learning activity and hours of non-guided study are shown to ensure that the total workload at the semester corresponds to the ECTS</i></p> <table border="1"> <thead> <tr> <th>Activity</th> <th>Student Workload (hours)</th> </tr> </thead> <tbody> <tr> <td>Lectures</td> <td>52</td> </tr> <tr> <td>Laboratory</td> <td>13</td> </tr> <tr> <td>Tutorial</td> <td>13</td> </tr> <tr> <td>Preparation for next lecture</td> <td>13</td> </tr> <tr> <td>Individual exercises</td> <td>54</td> </tr> <tr> <td>Preparation for final exams</td> <td>30</td> </tr> <tr> <td>Total Course (25 hours of workload per unit of credit)</td> <td>175</td> </tr> </tbody> </table>	Activity	Student Workload (hours)	Lectures	52	Laboratory	13	Tutorial	13	Preparation for next lecture	13	Individual exercises	54	Preparation for final exams	30	Total Course (25 hours of workload per unit of credit)	175
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ASSESSMENT OF STUDENTS

Description of the assessment process

Assessment Methods, Formative or Concluding, Multiple Choice Test, Quick Response Questions, Test Development Questions, Problem Solving, Written Work, Report / Report, Oral Examination, Public Presentation, Laboratory Work, Other / Other

Fully defined evaluation criteria are mentioned and if and where they are accessible to students.

Describe explicitly methods, evaluation tools and provided feedback.

The table below is supplemented accordingly.

Assessment methods	Number	Percentage
Written examination	1	50%
Exercises	3	40%
Laboratory Work	1	10%

LITERATURE AND STUDY MATERIALS / READING LIST

- Thomas A. Standish: Data Structures, Algorithms and Software Principles in C, Addison-Wesley. 1995.
- Robert Sedgewick: Algorithms in C
- Michael T. Goodrich, Roberto Tamassia: Data Structures and Algorithms in JAVA
- Slides from lectures
- Relevant material from the Web page of the course