

2010-11 academic year

Data Structures and Algorithms (21417)

Degree/study: Bachelor's degree in Computer Sciences (3377)**Year:** 2nd**Term:** 1st**Number of ECTS credits:** 4 credits**Hours of studi dedication:** 100 hours**Teaching language or languages:** catalan**Teaching Staff:** Narcís Parés

1. Presentation of the subject

Data Structures and Algorithms is one of subjects in the programming languages' area, along with *Programming Fundamentals* (1st year, during the 2nd and 3rd quarters) and *Object Oriented Programming* (2nd year, during the 1st quarter and in parallel with our subject). While these last two subjects are common to the three degrees (Computer Science Engineering, Telematics Engineering and Audiovisual Systems Engineering), our course is a specialization for Computer Engineering only. Thus, the first objective of this subject is that students start thinking as problem analysts and not just programmers. However, the capabilities and skills of data structures programming and abstract data types are important in this subject.

To take this course, students are supposed to have acquired basic knowledge and skills in the first-year course of *Programming Fundamentals*. After the two quarters of this subject, students will have mastered basic techniques and elemental programming structures as well as flow control structures. In Data Structures and Algorithms we will study it in depth, concentrating ourselves on ways of structuring information used in a program, how to manage this information and how to get it so that there are no collateral effects on rest of the program. We will also study how to evaluate their implementation both in respect to optimal use of memory space and to runtime operations and algorithms with which data are managed.

This course is devoted to the following basic structures: Linear Structures, Tree Structures and Associative Structures, which will be programmed in the C language, which students already know from the *Programming Fundamentals Course*. In addition, the course will specially promote the ability to analyze a problem from the standpoint of the information used and managed in a program, and how to design and program the best solution in terms of data structures and management operations. Student learning is much aimed at solving problems that present the closest possible scenarios in real cases.

Learning activities are structured in the following way:

- Lectures: teachers present a series of concepts and techniques as well as some examples. Students need to revise their notes on the course after it so that they become acquainted with what they learn.
- Seminar Sessions: in small groups, students will solve exercises that help consolidating the theoretical concepts and which link them to the practical work. Students will work individually and during class time. These exercises will be supervised by the teachers who will solve any questions that may arise and help students in this consolidation process.
- Practical Sessions: in teams of three people, students will be confronted to practical aspects related to the solution of the course's problems. They will basically train their data structures programming and operations management abilities. However, they will have to be able to analyse these aspects in the best way. Students will start these exercises during the practical session but, since they are demanding, they will have to finish them after it.
- Self-Evaluation Exercises: these exercises can be found in a list on the Aula Global so that students can do them outside class and keep track of their learning progress.