

DTC-GITT-215 Algorithms

SEMESTER: Fall or Spring

CREDITS: 6 ECTS (4 hrs. per week: 3 Theory + 1 Lab, on average)

LANGUAGE: Spanish

DEGREES: GITT

Course overview

This course reviews some basic algorithms and their utility in computer science. We will study a broad set of algorithms classified by their complexity and utility. Each lesson will be completed with encoding techniques or at least pseudocode easy to understand and program. Due to this, knowledge about programming languages is required.

Prerequisites

Knowledge of C programming language.

Course contents

Theory:

1. Introduction to algorithms.
2. Growth of functions.
3. Divide and Conquer.
4. Probabilistic and randomized algorithms.
5. Sorting and order algorithms. Heapsort, quicksort, sorting in linear time.
6. Data structures. Elementary data structures, hash tables, binary search trees.

Laboratory:

There will be six 2-hour sessions between the third and the last lecture week, including the lab exam.

- P1.** Probabilistic and randomized algorithms..
- P2.** Sorting and order algorithms.
- P3.** Data structures.
- P4.** Exam.

Textbook

- Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, “Introduction to Algorithms”, Third Edition. MIT Press 2009.

Grading

The following conditions must be accomplished to pass the course:

- A minimum overall grade of at least 5 over 10.
- A minimum grade in the final exam of 4 over 10.

The overall grade is obtained as follows:

- Final exam 50%.
- Other exams 30%. Typically there is 1 mid-term exam (2-hour long) and 2 additional short exams (1-hour long). They are weighted according to their duration.
- Lab exam 15%.
- Performance during the lab sessions and class attendance 5%.