



University of Engineering and Technology
School of Computer Science
Syllabus of Course – Academic Period 2017-I

1. Code and Name: CS311. Competitive Programming

2. Credits: 4

3. Hours of theory and Lab: 2 HT; 4 HP;

4. Professor(s)

Meetings after coordination with the professor

5. Bibliography

[Cor+09] T. H. Cormen et al. *Introduction to Algorithms*. MIT Press, 2009.

6. Information about the course

(a) **Brief description about the course** Competitive Programming combines problem-solving challenges with the fun of competing with others. It teaches participants to think faster and develop problem-solving skills that are in high demand in the industry. This course will teach you to solve algorithmic problems quickly by combining theory of algorithms and data structures with practice solving problems.

(b) **Prerequisites:** CS212. Análisis y Diseño de Algoritmos. (5^{to} Sem)

(c) **Type of Course:** Mandatory

7. Competences

- That the student uses techniques of data structures and complex algorithms..
- That the student apply the concepts learned for the application on a real problem.
- That the student investigate the possibility of creating a new algorithm and / or new technique to solve a real problem.

8. Contribution to Outcomes

a) An ability to apply knowledge of mathematics, science. (**Usage**)

b) An ability to design and conduct experiments, as well as to analyze and interpret data. (**Usage**)

i) An ability to use the techniques, skills, and modern computing tools necessary for computing practice. (**Usage**)

j) Apply the mathematical basis, principles of algorithms and the theory of Computer Science in the modeling and design of computational systems in such a way as to demonstrate understanding of the equilibrium points involved in the chosen option. (**Usage**)

9. Competences (IEEE)

C1. An intellectual understanding and the ability to apply mathematical foundations and computer science theory.⇒ **Outcome a,b**

C24. Understanding the need for lifelong learning and improving skills and abilities.⇒ **Outcome i,j**

10. List of topics

1. Primera Unidad

11. Methodology and Evaluation

Methodology:

Theory Sessions:

The development of the theoretical sessions is focused on the student, through his active participation, solving problems related to the course with the individual contributions and discussing real cases of the industry. The students will develop throughout the course a project of application of the tools received in a company.

Lab Sessions:

Practical sessions are held in the laboratory. Laboratory practices are performed in teams to strengthen their communication. At the beginning of each laboratory the development of the practice is explained and at the end the main conclusions of the activity in group form are highlighted.

Oral Presentations :

Individual and team participation is encouraged to present their ideas, motivating them with additional points in the different stages of the course evaluation.

Reading:

Throughout the course different readings are provided, which are evaluated. The average of the notes in the readings is considered as the mark of a qualified practice. The use of the UTEC Online virtual campus allows each student to access the course information, and interact outside the classroom with the teacher and with the other students.

Evaluation System:

12. Content

Unit 1: Primera Unidad (20)	
Competences Expected: C24,C1	
Learning Outcomes	Topics
<ul style="list-style-type: none">• Learning to select the right algorithms for a given problem, integrating multiple algorithms for solving a complex problem. [Usage]• Design new algorithms for real-world problem solving.[Usage]	<ul style="list-style-type: none">• Data structure• Dynamic programming• Graph-based algorithms• Sort algorithms
Readings : [Cor+09]	