



**Universidad Nacional Mayor de San Marcos**  
**School of Computer Science**  
**Syllabus of Course**  
**Academic Period 2018-II**

1. **Code and Name:** CS3101. Competitive Programming (Mandatory)
2. **Credits:** 4
3. **Hours of theory and Lab:** 2 HT; 4 HL; (15 weeks)
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:** CS2102. Analysis and Design of Algorithms. (5<sup>th</sup> Sem)
- (c) **Type of Course:** Mandatory
- (d) **Modality:** Face to face

**7. Specific goals of the Course**

- 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**)
- h) A recognition of the need for, and an ability to engage in life-long learning. (**Usage**)
- 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**)
- h) A recognition of the need for, and an ability to engage in life-long learning. (**Usage**)

**9. Competences (IEEE)**

- C1.** An intellectual understanding and the ability to apply mathematical foundations and computer science theory.⇒  
**Outcome a,b**
- C2.** Ability to have a critical and creative perspective in identifying and solving problems using computational thinking.  
⇒ **Outcome a,b**

**C24.** Understanding the need for lifelong learning and improving skills and abilities.⇒ **Outcome h**

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**C2.** Ability to have a critical and creative perspective in identifying and solving problems using computational thinking. ⇒ **Outcome a,b**

**C24.** Understanding the need for lifelong learning and improving skills and abilities.⇒ **Outcome h**

## 10. List of topics

1. Primera Unidad

## 11. Methodology and Evaluation

### Methodology:

#### Theory Sessions:

The theory sessions are held in master classes with activities including active learning and roleplay to allow students to internalize the concepts.

#### Lab Sessions:

In order to verify their competences, several activities including active learning and roleplay will be developed during lab sessions.

#### 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

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