

## 30260 - Bioinformatics

### Syllabus Information

**Academic year:** 2023/24

**Subject:** 30260 - Bioinformatics

**Faculty / School:** 110 - Escuela de Ingeniería y Arquitectura

**Degree:** 439 - Bachelor's Degree in Informatics Engineering

**ECTS:** 6.0

**Year:** 4

**Semester:** Second semester

**Subject type:**

**Module:**

### 1. General information

In this subject the student will learn the basic concepts of molecular biology as well as the main challenges of bioinformatics, improve his ability to design and develop algorithms adapted to the specific context of bioinformatics, and learn and apply other informatics methodologies in this field.

### 2. Learning results

**The student, in order to pass this subject, must demonstrate the following results...**

1. Know basic concepts of molecular biology along with the fundamental problems of bioinformatics.
2. Know how to particularize general algorithmic schemes to solve problems.
3. Know how to identify the most relevant components of a problem and to select the most appropriate algorithmic technique for it, as well as to argue in a reasoned way such choice.
4. Know how to compare problems and use this comparison to solve one problem from an efficient solution of another.
5. Can reason about the correctness and efficiency of the advanced algorithms used.
6. Ability to work in a group, identify group objectives, outline a work plan to achieve them, recognize the different roles within a team, and assume commitment to the tasks assigned.
7. Manage self-learning and development including management and organizational time.
8. Appreciate the need for continuous learning.

### 3. Syllabus

1. Introduction to bioinformatics. Basic concepts of molecular biology. String algorithms.
2. Alignment methods. Pair alignment. Heuristic methods for searching biological repositories. Multiple alignments.
3. Gene and promoter prediction. Signal search. Hidden Markov models.
4. Learning algorithms in bioinformatics.
5. Computational phylogenetics.
6. Structural bioinformatics.

### 4. Academic activities

**The program offered to the student to help their achieve the expected results comprises the following activities...**

1. The syllabus will be developed in the classes taught in the classroom.
2. In the problem classes, problems of application of the concepts and techniques presented in the program will be solved.
3. The practical sessions are held in a computer laboratory.

## **5. Assessment system**

Option without final exams:

1. Laboratory practices (in groups) during the four-month period: 35%.
2. Individual presentation during the four-month period: 10%.
3. Completion and presentation of a paper on the subject: 55%.

Option based exclusively on final exams:

1. Practical part: Practical (individual) programming exam: 20%.
2. Part of theory and problems: Final exam: 80%.