UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Elementi di Bioinformatica

1920-3-E3101Q116

Aims

The student will know some fundamental problems and algorithms in bioinformatics. The student will be able to write small size programs to solve some problems in bioinformatics, using also data originating from publicly available databases.

Knowledge and understanding

This course provides basic knowledge and understanding on:

- Algorithms on biological sequences
- Data structures to index biological sequencing
- Algorithms for phylogeny reconstruction
- C programming in bioinformatics
- Unix shell
- Version control
- Python programming in bioinformatics
- File Formats used in bioinformatics

Ability to apply knowledge and understanding

At the end of the course the students will be able to:

- decide which algorithms and data structures can be used to solve some problems in bioinformatics
- write efficient C programs for bioinformatics problems
- write Python programs for bioinformatics problems

Contents

Fundamental problems and algorithms in bioinformatics. Pattern matching.Sequence Alignment. DNA sequencing. Evolutionary histories. Managing biological data and databases.

Detailed program

1. Pattern matching: Algorithms and Data Structures
2. Sequence Alignment
3. DNA Sequencing
4. Evolutionary trees
5. Biological Data: file formats
6. Biological Databases
7. Bionformatics open source software development methodologies

Prerequisites

Algorithms and data structures; Programming Languages

Teaching form

Lectures and Laboratory. The individual study can use the e-learning platform to enrich the standard activities and to self assess the level of competence acquired during the course.

This course is taught in Italian.

Textbook and teaching resource

Algorithms on Strings, Trees and Sequences: Computer Science and Computational Biology. Dan Gusfield. Additional material will be given by the teachers

Semester

First semester

Assessment method

The assessment has two parts:

1. a written exam, to be taken individually, on the notions presented during the lectures on the algorithms topics. This part consists of open-ended questions.

2. a project work, mainly consisting of programming, that can be done by a single individual or a small group (max 3 students)

The final grade is obtained by weighting 25% of the degree of the written exam and 75% the project work.

There are no in-progress exams.

Office hours

by reservation