



BIOINFORMATICA

INF/01 - 6 CFU - 1° Semester

Teaching Staff

ALFREDO FERRO

Email: ferro@dmi.unict.it

Office: Stanza 40, Blocco III, Dipartimento di Matematica e Informatica, Viale Andrea Doria 6, 95125 Catania (CT)

Phone: 0957383071

Office Hours: Su appuntamento

LEARNING OBJECTIVES

General teaching training objectives in terms of expected learning outcomes.

- **Knowledge and understanding:** The course aims to give the knowledge and basic and advanced skills to the analysis of bioinformatics data.
- **Applying knowledge and understanding:** the student will acquire knowledge about the models and algorithms for analyzing bioinformatics data.
- **Making judgments:** Through concrete examples and case studies, the student will be able to independently develop solutions to specific problems related to bioinformatics data analysis.
- **Communication skills:** the student will acquire the necessary communication skills and expressive appropriateness in the use of technical language in the general area of bioinformatics and computational biology.
- **Learning skills:** The course aims to provide students with the necessary theoretical and practical methods to deal independently and solve new problems that may arise during a work activity. For this purpose, different topics will be covered in class by involving students in the search for possible solutions to real problems, using benchmarks available in the literature.

COURSE STRUCTURE

Lectures

DETAILED COURSE CONTENT

- Prerequisites of Biology
 - Cells, genomes and evolution
 - The genome and the genes

- Transcription
 - Translation
 - Coding and non-coding RNA
 - Prerequisites of probability and statistics for bioinformatics
 - Data mining and learning for bioinformatics
 - Programming languages and environments for bioinformatics (R, python)
 - Pairwise and Multiple Alignment
 - Biological databases
 - Transcriptome analysis tools (Microarrays, Next-generation Sequencing) and Biomarkers
 - DNA sequencing and microbiome analysis
 - Computational tools for RNA Interference
 - Tools for Mining of biological networks (Graph Matching, Network Biomarkers, Pathway Analysis, Network Alignment, Microbic Networks)
-

TEXTBOOK INFORMATION

- Anna Tramontano “Bioinformatica” Zanichelli
 - Krane, Raymer. “Fondamenti di Bioinformatica” Pearson
 - Jambeck, Gibas “Developing Bioinformatics Computer Skills” O'Reilly
 - Pascarella-Paiardini “Bioinformatica” Zanichelli
 - Lewin “Il Gene” - Edizione Compatta-Zanichelli
-