



UNIVERSITÀ  
degli STUDI  
di CATANIA

DEPARTMENT OF BIOMEDICAL AND BIOTECHNOLOGICAL  
SCIENCES

Master's Degree in Sciences and techniques of preventive  
and adaptative motor activities

Academic Year 2018/2019 - 1° Year

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## COMPUTER SCIENCE

2 CFU - 2° Semester

### Teaching Staff

#### ALFREDO PULVIRENTI

**Email:** apulvirenti@dmi.unict.it

**Office:** Stanza 35, Terzo Blocco Dipartimento di Matematica e Informatica.

**Phone:** 095-7383087

**Office Hours:** Martedì 10-11.

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### LEARNING OBJECTIVES

Objective of the course is the acquisition of methods for the analysis of biological sequences and structures and the capability of searching in biological databases (eg. Genes, sequences, functional domains). Starting from primary sequences of nucleic acids or proteins can hypothesize the function, evolutionary history and structure. The tools used to achieve these objectives are the public databases and the tools for the analysis and visualization of such kind of data.

**Knowledge and understanding:** Students will gain knowledge on methods for the analysis of biological sequences and for searching in biological databases. In particular students will be able to search on database of sequences and domains. Also, public databases available on NCBI will be presented together with software for the analysis and visualization of biological data. Finally, students will acquire the basic tools for the analysis of the transcriptome.

**Applying knowledge and understanding:** identify the appropriate tools to manipulate data and extract knowledge underlying; solve problems through the use of appropriate software in bioinformatics.

**Making judgments:** Through guided exercises, the students will acquire the basic skills necessary to deal with the analysis of new biological sequences, hypothesizing the function, study the transcriptome.

**Communication skills:** the student will acquire the necessary communication skills and expressive appropriateness in the use of technical language within the general framework of the analysis of biological data.

**Learning skills:** The course aims, as the goal, to provide students with the necessary basic theoretical methods and practices in order to address and solve problems concerning the analysis of biological data.

### COURSE STRUCTURE

Lectures

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## **DETAILED COURSE CONTENT**

Introducion to relational Databases: • Data representation; • The Relational model; • Relational Algebra; • Database Design; • Access: Tables, queries, report, forms; • Examples and case studies. Biological and biomedical databases: - NCBI: The Entrez system. Methods for querying databases Gene, Nucleotide, Protein, PubMed, OMIM. - Special purpors databases: Protein Data Bank (PDB), Single Nucleotide Polymorphism DB (SNP), Gene Expression Omnibus (GEO), Genome, UCSC, ENSEMBL, Gene Ontologies DB, BioSystem Pathways, KEGG Patways, Patways Commons, Tarbase, Mirò, mirBase, Expressed Sequence Tag (EST). Locked

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## **TEXTBOOK INFORMATION**

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