# General Information

**Proteomes Interactomes and Biological Networks**

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Biomolecules
Folding and
Disease

# General Information

The Proteomes, Interactomes and Biological Networks course will run from November 4 to December 14. All the lectures are given in room and labs located in Via della Beverara 123.

This is a 62-hour course corresponding to 6 credits.
Course materials will be made available at:
http://biofold.org/pages/courses/pibn/pibn-2021.html

The full schedule is available at:
http://biofold.org/pages/courses/lb1-2/docs/pibn-schedule-2021.pdf

The usage of personal laptop with linux operating system is encouraged.
http://biofold.org/emidio/tmp/VmCapriotti.vdi.gz

# Topics

- Protein sequence and structure
- Amino acids properties and propensities
- Protein complexes and interactions
- Reference databases of protein sequence and structure
- Types of macromolecular interactions
- Protein and gene interaction databases
- Principles of graph theory
- Analysis of biological networks

# Course Format

The course includes theoretical and paratactical sessions

**Theoretical sessions (4 CFU)**: lectures, project planning

**Practical sessions (2 CFU):** exercises, project implementation, programming

The project report should by email to emidio.capriotti@unibo.it

The report is sent in PDF format named *lastname_pibn2021pdf.* Supplementary materials should be provided in a unique zipped file.

# Learning Outcomes

**Theoretical:**

- Physico-chemical properties of the amino acids
- Main interactions driving the formation of protein structure
- Protein-protein interactions
- Macromolecular networks
- Principles of graph theory
- Analysis of the biological networks

**Practical:**

- Bash scripting and Python programming
- Information retrieval in web available databases
- Analysis of protein structure and protein-protein complexes
- Analysis and visualization of biological networks

# Evaluation

Students will be evaluated considering:

- course participation
- research project
- oral exam

The final exam aims to verify the level of knowledge acquired during the theoretical and practical parts of the corse.

Before attending the final oral exam, the student has to provide the written report on the practical project. For the exam, the student is expected to answer questions about the project and all the main topics of the course.

**Project deadline:** 31 December, current year

# Scripting and Programming

During the practical part of the course it is suggested to work on the ubuntu virtual machine installed on the PCs in the lab or in your personal laptop.

The user studente is accessible without any password

A sudo user *emidio* with password *$$emidio* is available for the installation of software and packages.

The commands for searching and installing the packages are

> sudo apt search package

> sudo apt install package

# System Configuration

The ubuntu virtual machine can run under *VirtualBox* and the configuration can be modified.

Under the Ubuntu operating system it is suggested to configure the terminal and a text editor.

In particular:

under the preferences of the terminal you can modify the shortcuts

- modify the .*bashrc* file to add specific paths or create new aliases
- install *vim* terminal text editor
- install and configure text editor with GUI such as *Geany*