

General Information

Proteomes Interactomes and Biological Networks

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<http://biofold.org/>



Biomolecules
Folding and
Disease

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General Information

The Proteomes, Interactomes and Biological Networks course will run from **November 5 to December 11**. 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-2019.html>

The full schedule is available at:

<http://biofold.org/pages/courses/pibn/docs/pibn-schedule-2019.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 be sent by email to emidio.capriotti@unibo.it

The **report is sent in PDF format** named *lastname_pibn2019.pdf*.
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 course.

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: 23 December, 2019

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 *Virtual Box* 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*