



Visiting Professor Program Academic Year 2023/2024

TEACHING COMMITMENT: 12 hours

COURSE TITLE

Structure of Macromolecules and Proteomics

TEACHING PERIOD

1st term

SCIENTIFIC AREA

Biochemistry

LANGUAGE USED TO TEACH

English

COURSE SUMMARY

This teaching contributes to the learning objectives included into the Biomolecular area of the Master in Cellular and Molecular Biology providing an in-depth and integrated knowledge of biological systems at molecular level focusing on quantitative and qualitative analysis of biological macromolecules and bioinformatic analyses.

In particular, the course provides the student the fundamental knowledge of:

- protein folding,
- structure and the spectroscopic techniques used to study protein conformation and solve their 3D structure,
- protein crystallography, cryo-EM,
- instrumentation and techniques employed in the field of proteomics,
- strategies for the construction of protein arrays and protein chips.

Laboratory-based experiments on protein crystallization and protein stability analysis through calorimetry (DSC) will provide the student a practical overview of the approaches that can be used for protein folding and structure studies.

Moreover, the student will learn the use of up to date bioinformatics tools for protein modeling and docking.

LEARNING OBJECTIVES

At the end of the course, the students should know:

- the different levels of protein structure and their graphical representation;
- structural interpretation in terms of polypeptide chain folding;
- structure-function relationships of biological macromolecules,
- the study of protein folding,
- evolution of protein structures and protein modules,
- spectroscopy applied to biological macromolecules,
- X-ray crystallography and cryo-EM
- techniques for the study of the proteome,
- protein arrays and protein chips.

APPLYING KNOWLEDGE AND UNDERSTANDING.

At the end of the course, the student will be able to:

- Recognize and classify protein structures
- Select the appropriate spectroscopic technique for structural and functional protein studies
- Understand and apply the techniques of protein immobilization for biochips
- Understand the principles of mass spectrometry applied to proteomics
- Use databases of sequences and protein structures
- Visualize, calculate and study the protein structures using molecular graphics software.

TUTORSHIP ACTIVITIES

N/A

LAB ACTIVITIES

N/A

OTHER ACTIVITIES BESIDES THE COURSE

N/A

VISITING PROFESSOR PROFILE

The Visiting Professor should be an internationally recognized specialist in the field of structural biology. She/he should have a well documented scientific record in the study of protein structure with a deep knowledge in state of the art techniques that include x-ray crystallography and cryogenic electron microscopy.

CONTACT REFERENT

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