
Testi del Syllabus

Resp. Did. **LAMBA DORIANO** **Matricola: 027475**

Docente **LAMBA DORIANO, 6 CFU**

Anno offerta: **2018/2019**

Insegnamento: **608SM - TECNICHE DI INDAGINE BIOSTRUTTURALE CON LUCE DI SINCROTRONE**

Corso di studio: **ME02 - BIOTECNOLOGIE MEDICHE**

Anno regolamento: **2017**

CFU: **6**

Settore: **BIO/10**

Tipo Attività: **B - Caratterizzante**

Anno corso: **2**

Periodo: **Primo Semestre**



Testi in italiano

Lingua insegnamento INGLESE



Testi in inglese

English

Synchrotron Radiation Fundamentals, Methods and Applications to explore the Structure-Activity-Functional relationships of biological macromolecules: proteins, nucleic acids, protein-DNA and protein-RNA complexes, protein-protein and protein-ligand interactions.

C. Branden and J. Tooze - Introduction to Protein Structure - 2nd Edition, Garland Publishing (1999)

G. A. Petsko and D. Ringe - Protein Structure and Function - New Science Press Ltd (2004)

D. Blow - Outline of Crystallography for Biologists, Oxford University Press (2006)

G. Rhodes - Crystallography Made Crystal Clear, Academic Press (2006)

E. Lattman and P.J. Loll - Protein Crystallography - A concise guide. The John Hopkins University Press (2008)

B. Rupp - Biomolecular Crystallography: Principles, Practice, and Application to Structural Biology, Garland Science (2009)

D. Sherwood and J. Cooper - Crystals, X-rays and Proteins- Oxford University Press (2011)

Review articles; Lecture Notes

Aim of the course is to provide the student with basic knowledge on Synchrotron Radiation based Methods to elucidate the high and low resolution 3D structure of biological macromolecules, including the major

biophysical techniques employed for the characterization of structural transitions, protein folding and stability and macromolecular interactions.

Physical Biochemistry, Molecular Biology, Biophysics.

The Course consists of two-hours lectures, carried out using PowerPoint presentations that illustrate the various aspects of the examined topics. The PPT files will be available to the students.

Four hours of the course will be carried out at the Italian Synchrotron Radiation Facility, Area Science Park – Basovizza and include a visit of the CNR-Elettra Structural Biology Lab, the X-ray diffraction and Small Angle X-ray Scattering beamlines.

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Oral examination with assessment of the acquired knowledge and critical evaluation of the concepts: a Power Point presentation in English on one of the topics of the Course at choice of the student with examples of Synchrotron radiation based applications taken from recently published publications.

Broad and specific questions in order to evaluate: i) the student ability to focus the presented topic and to compare it with complementary biophysical methods treated in the Course; ii) the student ability to discuss the advantages / disadvantages of Synchrotron radiation based methods in Structural Biology.

Integrative Structural Biology: an overview of Synchrotron Radiation based biophysical methods to characterize biological macromolecules; Modern biophysical methods to explore the structure of biological assemblies.

Bio-molecular crystallography: basic diffraction in theory and in practice

The phase problem; how to solve the phase problem (MIR, MAD, MR)

Density modification and 3D model building

Refinement; Structure Validation

Synchrotron- Radiation based Small Angle X-ray Scattering of biological macromolecules

Synchrotron Radiation based UV-VIS Circular Dichroism of biological macromolecules

How to read critically a structural biology paper

How to “use” a PDB entry

Recent breakthroughs in Structural Biology: ad hoc selected case studies.