Anno Accademico 2021/2022

STRUCTURAL BIOINFORMATICS	
Enrollment year	2021/2022
Academic year	2021/2022
Regulations	DM270
Academic discipline	INF/01 (COMPUTER SCIENCE)
Department	DEPARTMENT OF BIOLOGY AND BIOTECHNOLOGY "LAZZARO SPALLANZANI"
Course	ADVANCED BIOTECHNOLOGY
Curriculum	PERCORSO COMUNE
Year of study	1°
Period	2nd semester (01/03/2022 - 14/06/2022)
ECTS	6
Lesson hours	48 lesson hours
Language	Italian
Activity type	ORAL TEST
Teacher	CARUGO OLIVIERO ITALO (titolare) - 6 ECTS
Prerequisites	Basics in inorganic chemistry, organic chemistry, physical chemistry, molecular biology, biochemistry, and structural biology.
Learning outcomes	At the end of the course, the students are expected to be able to understand and apply the most important techniques of structural bioinformatics to any problem of biochemistry and molecular biology. This includes: (i) predictions of secondary, tertuary and quaternary structures of proteins; (ii) validations of prediction methods; (iii) use of the main databases.
Course contents	The course is divided into three main parts. (i) Introduction to molecular graphics to show and analyze the three-dimensional structures of proteins and protein complexes; (ii) Principal techniques of protein

structure prediction (secondary structure, conformational disorder, solvent accessibility, tertiary structure – homology modelling and fold recognition – quaternary structure, and functional annotation), introduction to the most important databases (PDB, CATH, SCOP etc.) and on-line resources for continuous education; (iii) Analysis of some computational techniques of structural bioinformatics, like support vector machines, artificial neural networks, molecular mechanics and molecular dynamics.

Teaching methods	During the course, a series of guided exercises will be intercalated among the lectures, in order to provide a working experience.
Reccomended or required readings	Protein Bioinformatics: From Sequence to Function. M.Michael Gromiha, 2010, Academic Press.
Assessment methods	oral examination (one topic selected by the student and two topics selected by the lecturer) and brief practical exercise of molecular graphics.
Further information	The students are encouraged to contact the lecturer (by email or at the end of the lectures) to discuss any pedagogical problem related to the course and to receive (in presence or online) pertinent explanations.
Sustainable development goals - Agenda 2030	Students are informed about the energy cost of computers and calculations (comparison between cpu-gpu, heat produced by processors). $lbl_legenda_sviluppo_sostenibile