Testi del Syllabus

Resp. Did.	**D'ANGELO IGOR EDMONDO PAOLO**	**Matricola: 048736**
Docente	**D'ANGELO IGOR EDMONDO PAOLO, 3 CFU**	

Anno offerta:	**2025/2026**
Insegnamento:	**510899 - RATIONAL DESIGN IN MODERN BIOTECHNOLOGY: FROM CONCEPT TO CLINIC**
Corso di studio:	**08415 - BIOTECNOLOGIE AVANZATE**
Anno regolamento:	**2024**
CFU:	**3**
Settore:	**BIO/11**
Tipo Attività:	**D - A scelta dello studente**
Anno corso:	**2**
Periodo:	**Primo Semestre**

Testi in italiano

Lingua insegnamento	INGLESE

Obiettivi per lo sviluppo sostenibile

Codice	Descrizione
3	Salute e benessere

Testi in inglese

	English
	Bachelor-level knowledge of molecular biology and chemistry.
	Learning the fundamental concepts of structure-based drug development using rational design and applying them to case studies.
	Introduction to the pharmaceutical development process (from concept to the clinic). Small vs large molecule biotherapeutics, pros and cons and applicability. Antibodies and foundational immunology. Antibody discovery: approaches to generate repertoires (incl. hybridoma, mammalian cell, in vitro and ML-based). In vivo vs in vitro antibody libraries, options and limitations. Antibody rational engineering and optimization: demo of the Abacus suite

	for sequence/structure based optimization via Machine Learning. Antibody rational engineering and optimization: liabilities and immunogenicity. Structure based rational design: introduction and demo utilizing the MOE suite and intro to BioPhi. One day MOE workshop. Rational design and engineering of affinity and stability. Example studies of rational design in biotherapeutics: antibodies, antibody-like and new approaches. Integrating deep sequencing for antibody engineering. Career options in the pharmaceutical development field, pros and cons and discussion.
	Lectures; practice exercises to use antibody databases and structural modeling software (MOE) for antibody design; round tables between teacher and students to further delve into topics addressed in the lectures and into more general themes about working in a biotech company.
	Slides, temporary software license and other material provided by the teacher.
	Mandatory attendance of lectures and interactive activities (no final exam).
	A laptop (Mac or PC, running the latest OS) is required for the MOE workshop day. Please bring a 3-button mouse. Details will be provided on the first day of the course.
	The rational design of biotherapeutics, in particular relatively to antibody engieering, matches goal n. 3 of the Agenda 2030 for the sustainable development: "Good Health and Well-being" (3.B Support the research and development of vaccines and medicines for the communicable and noncommunicable diseases).

Obiettivi per lo sviluppo sostenibile

Codice	Descrizione
3	Good health and well-being