



METHODS IN BIOCHEMISTRY	
Enrollment year	2021/2022
Academic year	2021/2022
Regulations	DM270
Academic discipline	BIO/10 (BIOCHEMISTRY)
Department	DEPARTMENT OF BIOLOGY AND BIOTECHNOLOGY "LAZZARO SPALLANZANI"
Course	
Curriculum	PERCORSO COMUNE
Year of study	1°
Period	1st semester (01/10/2021 - 14/01/2022)
ECTS	9
Lesson hours	72 lesson hours
Language	English
Activity type	ORAL TEST
Teacher	GUIDETTI GIANNI FRANCESCO (titolare) - 3 ECTS IADAROLA PAOLO - 6 ECTS
Prerequisites	Basic knowledge of biochemistry and molecular biology. Knowledge of the general concepts about protein structure and function.
Learning outcomes	The students will acquire the ability to provide a complete description and practical examples of several common techniques used in the biochemical investigations and to critically discuss the most important aspects of experimental biochemistry.
Course contents	Methods for extraction and purification of proteins from animal/vegetal tissues and cultured cells. Procedures typically used in industry/research laboratories for primary purification of proteins. Theoretical principles and practical protocols of the most common chromatographic approaches: adsorption; partition; ion-exchange (IEC); gel-filtration (SEC); affinity; hydrophobic-interaction (HIC); perfusion;

	gas-chromatography (GC) and supercritical-fluid chromatography (SFC). Chromatofocusing; high performance liquid chromatography (HPLC); fast protein liquid chromatography (FPLC) and principles of green chromatography. Electrophoretic techniques: analytical and preparative monodimensional (1-DE) electrophoresis of proteins in their native and denaturated state. Sodium-dodecyl-sulfate gel electrophoresis (SDS-PAGE). Isoelectrofocusing (IEF). Two-dimensional (2-DE) electrophoresis: application to proteomic studies. Capillary Zone electrophoresis (CZE) and Micellar Electrokinetic Chromatography (MEKC). Spectroscopic techniques for the qualitative/quantitative characterization of proteins. Absorption spectroscopy: ultraviolet (U.V.); Visible; Infrared (IR); Nuclear Magnetic Resonance (NMR); Electron Spin Resonance (ESR). Emission spectroscopy: fluorescence and phosphorescence. Mass Spectrometry (MS). Radioisotopes: principles, manipulation, types of emission, detection and measurement of radiation. Use of radioisotopes in biochemistry. Immunochemical techniques: production and purification of polyclonal and monoclonal antibodies and their application in biochemistry. Radioimmuno assay (RIA) and enzyme-linked immunosorbent assay (ELISA): applications in industry, clinical biochemistry and environmental monitoring.
Teaching methods	Frontal lessons, seminars on specific topics, guided lab tours and description of equipments and facilities for biochemical investigations.
Reccomended or required readings	Principles and Techniques of Biochemistry and Molecular Biology. Edited by Wilson and Walker
Assessment methods	Oral presentation of a scientific article. Description of the methods adopted in the paper and discussion of the results.
Further information	N/A
Sustainable development goals - Agenda 2030	N/A \$lbl_legenda_sviluppo_sostenibile