



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze e Tecnologie Biologiche, Chimiche e Farmaceutiche		
ACADEMIC YEAR	2022/2023		
BACHELOR'S DEGREE (BSC)	BIOLOGICAL SCIENCES		
SUBJECT	BASIC BIOCHEMICAL METHODOLOGIES		
TYPE OF EDUCATIONAL ACTIVITY	C		
AMBIT	10665-Attività formative affini o integrative		
CODE	17239		
SCIENTIFIC SECTOR(S)	BIO/10		
HEAD PROFESSOR(S)	DE BLASIO ANNA	Professore Associato	Univ. di PALERMO
OTHER PROFESSOR(S)			
CREDITS	6		
INDIVIDUAL STUDY (Hrs)	102		
COURSE ACTIVITY (Hrs)	48		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	2		
TERM (SEMESTER)	2° semester		
ATTENDANCE	Not mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	DE BLASIO ANNA Monday 14:00 16:00 Dipartimento STEBICEF, ed. 16 viale delle Scienze, Palermo Tuesday 13:00 14:00 Aula Teams "ricevimento studenti" link di accesso: https://teams.microsoft.com/channel/19%3a960f6e49ef91459b83d5f0dae1c43718%40thread.tacvGenerale?groupId=7981a70a-4c99-4814-883f-721b8bac75b6&tenantId Thursday 12:00 13:00 Ingegneria Biomedica-Sede di Caltanissetta (via Real Maestranza) Friday 10:00 11:00 Dipartimento FISICA E CHIMICA, aula AP4, ed. 18 viale delle Scienze, Palermo		

DOCENTE: Prof.ssa ANNA DE BLASIO

PREREQUISITES	Knowledge of chemistry (chemical bonds, acids and bases, chemical reactions, solutions); Organic Chemistry (classes of organic compounds, functional groups and reactivity); General knowledge of physics; Proper knowledge of biochemistry.
LEARNING OUTCOMES	The course provides the necessary knowledge of the physico-chemical principles of the techniques commonly used in biochemical investigation and their applications. The course aims to make the student able to individuate and critically evaluate the more appropriate methods for achieving a given experimental objective. The students must be able to evaluate the advantages and disadvantages in the use of specific procedures by critically examining scientific literature, the knowledge of resolving power and/or capacity of the technique, the chemical/physical properties of the studied substances, the availability of specific equipment and specialized personnel. Students must be able to present clearly, concisely and with proper scientific terminology the acquired knowledge. Ability to understand and review the subjects presented in the course. Ability to read, understand and comment a methodological protocol. Ability to identify, and properly employ the methods of investigation suited to solving problems related to the identification, quantification and purification of the biomolecules.
ASSESSMENT METHODS	Oral examination (consisting of at least four questions on the knowledge of the theoretical principles underlying the main laboratory techniques and their practical procedures) aimed to the achievement of the fundamental Learning Outcomes. The evaluation (in thirty) starts from 18/30 given when the goals achieved are just sufficient and elementary and reaches maximum 30/30 (cum laude) when the student demonstrates that has achieved the learning goals in an excellent way in a broad and conscious vision. An "in itinere" evaluations will be carry out during the course and will allow the student to self-assess their learning status and highlight any gaps to be filled with the teacher.
EDUCATIONAL OBJECTIVES	The course aims to provide students with a theoretical background on the techniques and methodologies used for biochemical investigation. In particular, topics related to the extraction, purification and characterization of biological macromolecules are developed.
TEACHING METHODS	Lectures
SUGGESTED BIBLIOGRAPHY	Wilson, Walker. Metodologia Biochimica (Le bioscienze e le biotecnologie in laboratorio). Cortina. edizione 5. ISBN: 8870786870 Wilson, Walker. Biochimica e Biologia molecolare. Principi e Tecniche. Cortina. edizione 8. ISBN: 8832851458 De Marco, Cini. Principi di Metodologia Biochimica. Piccin. edizione 2009. ISBN: 8829919977 Boyer. Modern experimental Biochemistry. Pearson Education (US). ISBN: 0805331115 Durante il corso verranno anche fornite le diapositive proiettate in aula.

SYLLABUS

Hrs	Frontal teaching
2	Presentation of the discipline and declaration of purpose. Choice of a technical procedure. Choice of an experimental system.
1	Buffers for biochemical investigations. pH measurements. pH meters. Biosensors
2	Preparation of a cell-free system.
4	Preparative and analytical centrifugation techniques.
2	Extraction and differential precipitation of proteins.
2	Extraction of DNA and RNA. Dosage and estimation of the integrity and purity.
1	Applications of dialysis and ultrafiltration. Lyophilization (Freeze-Drying).
10	Spectroscopic techniques: Absorption spectrophotometry; Fluorescence spectrophotometry; Flow cytometry; nephelometry and turbidimetry.
2	Enzymatic techniques: Dosage; Characterization; Purification.
6	Chromatographic techniques. Types of chromatography: Adsorption; Partition; Ion-exchange; Ion-pair; Gel exclusion; Affinity. Gas chromatography. High performance liquid chromatography (HPLC).
6	Electrophoretic techniques: electrophoresis in absence and in presence of a support medium; High voltage electrophoresis (HVE); Isoelectric focusing; isotachopheresis; Pulsed-field gel electrophoresis (PFGE); Electrophoretic mobility shift assay (EMSA); Capillary electrophoresis; Immunoelectrophoresis; Densitometry; Blotting procedures.
2	Immunochemical methods
4	in itinere evaluations test
4	Cell colture techniques and application examples.