



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Biomedicina, Neuroscienze e Diagnostica avanzata		
ACADEMIC YEAR	2019/2020		
BACHELOR'S DEGREE (BSC)	BIOMEDICAL LABORATORY TECHNIQUES		
INTEGRATED COURSE	CLINICAL BIOCHEMISTRY AND CLINICAL MOLECULAR BIOLOGY - INTEGRATED COURSE		
CODE	01557		
MODULES	Yes		
NUMBER OF MODULES	2		
SCIENTIFIC SECTOR(S)	BIO/12		
HEAD PROFESSOR(S)	BELLIA CHIARA	Professore Associato	Univ. di PALERMO
OTHER PROFESSOR(S)	BELLIA CHIARA	Professore Associato	Univ. di PALERMO
	AGNELLO LUISA	Professore Associato	Univ. di PALERMO
CREDITS	6		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	1		
TERM (SEMESTER)	2° semester		
ATTENDANCE	Mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	<p>AGNELLO LUISA</p> <p>Monday 10:00 12:00 Sezione di Biochimica Clinica, Medicina Molecolare Clinica e Medicina di Laboratorio, Dipartimento BIND, Via del Vespro 129</p> <p>Wednesday 10:00 12:00 Sezione di Biochimica Clinica, Medicina Molecolare Clinica e Medicina di Laboratorio, Dipartimento BIND, Via del Vespro 129</p> <p>BELLIA CHIARA</p> <p>Monday 12:00 14:00 Sezione di Biochimica Clinica, Medicina Molecolare Clinica e Medicina di Laboratorio, Dipartimento di Biomedicina, Neuroscienze e Diagnostica Avanzata (BiND), Via del Vespro 129</p> <p>Tuesday 12:00 14:00 Sezione di Biochimica Clinica, Medicina Molecolare Clinica e Medicina di Laboratorio, Dipartimento di Biomedicina, Neuroscienze e Diagnostica Avanzata (BiND), Via del Vespro 129</p>		

PREREQUISITES	The knowledge and skills defined annually by the ministerial decree for the admission test to the degree courses is required. Basic knowledge of physics, chemistry and biology and basic laboratory still represent essential points for the Integrated Course of Clinical Biochemistry.
LEARNING OUTCOMES	<p>Targets of the Biochemistry and Clinical Molecular Biology Integrated course are to acquire the basic knowledge (theoretical and practical) to critically evaluate the biochemical data at the in relation to human disease. In particular:</p> <ul style="list-style-type: none">• knowledge of the main laboratory tests and the cellular, molecular and pathophysiological basis which are prerequisites and foundation.• critical interpretation of laboratory tests results with regard to analytical and biological variation; reliability of diagnostic laboratory tests, examples of correct forms of laboratory reports.• basic concepts on the most relevant methodologies used in Clinical Biochemistry and their limitations.• appropriate use of laboratory tests in screening, staging and treatment of the disease.• correct interpretation of laboratory tests results and their critical correlation with molecular and cellular events induced by the disease.• acquisition of a proper programming prescription of tests in relation to the diagnosis or monitoring. <p>Knowledge of the main diagnostic tests used in the laboratory of Clinical Biochemistry and diagnostic significance of reference change values of the main laboratory parameters.</p> <p>Proper ordering for laboratory tests and using of guidelines and flowchart based on "Evidence Based Medicine".</p> <p>Be able to relate to colleagues and health operating in laboratory to understand and synthesize relevant information about all the problems, understanding their content and devising and agreeing on how to study.</p> <p>Perform adequately the request of the most common laboratory tests.</p> <p>Implement self-protection measures in the collection and handling of biological samples.</p>
ASSESSMENT METHODS	The learning assessment consists in an oral examination. Oral examination consists in a conversation in order to check competences and basic knowledge. The evaluation is expressed in thirtieths. The exam will tend to test the knowledge of the student achieved by assessing a) the knowledge captured; b) the processing capacity, c) the possession of adequate exhibition capacity. The pass mark will be reached when the student will demonstrate the knowledge of the issues at least in general terms, and has minimal application knowledge in order to solve concrete cases; the student must also have oral presentation skills to allow the transmission of his knowledge to the examiner. Below this threshold, the examination will be insufficient.
TEACHING METHODS	The didactic activity takes place through lectures.

MODULE
SPECIALIST CLINICAL BIOCHEMISTRY

Prof.ssa CHIARA BELLIA

SUGGESTED BIBLIOGRAPHY

Ciaccio M, Lippi G. Biochimica Clinica e Medicina di Laboratorio. Edises 2018

AMBIT	10338-Scienze biomediche
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INDIVIDUAL STUDY (Hrs)	45
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COURSE ACTIVITY (Hrs)	30
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EDUCATIONAL OBJECTIVES OF THE MODULE

Main targets of the course are: critical interpretation of medical laboratory tests in relation to analytical and biological variation; evaluation of the clinical performances of laboratory tests; how to report laboratory tests correctly; fully description of the techniques used in medical laboratories.

SYLLABUS

Hrs	Frontal teaching
2	Intro to Laboratory Medicine: handling and storage of biological samples; pre-analytical issues. Biological and analytical variation, accuracy and precision, analytical and clinical sensibility and specificity, laboratory errors, reference values, quality controls.
4	Serum proteins. Plasma cells dyscrasia: clinical relevance, separative technologies; immunological typing; quantification of monoclonal component; Bence Jones protein. Main clinically relevant serum proteins.
4	Electrophoresis: definition, basic concepts, main components of an electrophoresis systems. Serum protein electrophoresis. Capillary electrophoresis: main characteristics, components, electroendosmotic flow.
4	Chronic kidney disease. Acute kidney disease. Contrast-induced acute kidney injury. Laboratory diagnostics of kidney diseases. Proteinuria. Urinalysis. Chemical and physical analysis. Analysis and identification of cells. Identification of crystals. Correct interpretation of urinalysis.
4	Laboratory investigations in neurodegenerative dementia. Beta-amyloid and Tau protein as CSF biomarkers of Alzheimer disease. Analysis of cerebrospinal fluid. Macroscopic evaluation and cellular analysis. Chemical and physical analysis.
2	Basics of immunochemistry. Competitive assays. Noncompetitive assays. Homogeneous and heterogeneous immunoassays. Relationship between analytical signal and concentration.
4	Clinical molecular biology: hereditary thrombophilia, pharmacogenetics of oral anticoagulant. Liquid biopsy and its clinical applications.
2	Isolation of nucleic acid: phenol-chloroform purification, salting-out, chromatographic isolation. Electrophoresis of nucleic acid.
4	Amplification of nucleic acids: basic concepts; clinical applications; genotyping; RT-PCR; real-time PCR. Restriction enzymes, RFLP and SNPs. Hybridization of nucleic acids: reverse dot blot. Sanger sequencing and identification of mutations.

MODULE CLINICAL BIOCHEMISTRY

Prof.ssa LUISA AGNELLO

SUGGESTED BIBLIOGRAPHY

Ciaccio M, Lippi G. Biochimica Clinica e Medicina di Laboratorio. Edises 2018.

AMBIT	10338-Scienze biomediche
INDIVIDUAL STUDY (Hrs)	45
COURSE ACTIVITY (Hrs)	30

EDUCATIONAL OBJECTIVES OF THE MODULE

The student will have to acquire the methodological and cultural bases, as well as the ability to use the clinical biochemical data as a diagnostic tool.

Specific objectives of the module are to acquire the knowledge of the main laboratory tests and the biological, molecular and pathophysiological bases of the disease; to use laboratory tests correctly in screening, diagnosis and diseases monitoring; appropriate interpretation of results and their critical correlation with pathophysiological events; knowledge of the main biochemical methods used in the clinical laboratory.

SYLLABUS

Hrs	Frontal teaching
2	Laboratory tests: definition, types, requests.
2	Pre-analytical phase: preparation of the patient, collection of biological samples, processing and identification of biological samples. General laboratory techniques with descriptions of the principles. Post-analytical phase: data collection, calculation, automatic processing. Analytical variation, analytical error, quality control systems. Intra-individual and inter-individual biological variation, reference values, nomenclature and reporting of laboratory tests. Clinical sensitivity and specificity, predictive laboratory tests.
4	Basic biochemical technologies in clinical laboratory. Centrifugation. UV-visible spectroscopy (absorption and emission; main components of a spectrophotometer, Lambert and Beer's equation, kinetic analysis). Main application of UV-visible spectrometry: serum creatinine, glucose, total cholesterol, LDL and HDL cholesterol, triglycerides, direct and indirect bilirubinemia, AST, ALT. Fluorometry (emission, main components of a fluorometer, quantitative analysis, main application in clinical biochemistry).
4	Metabolism of lipids. Characteristics of lipoprotein. Primary and secondary dyslipidemia. Metabolic syndrome
3	Myocardial infarction: risk factors, biochemical modification in the necrotic area; clinical enzymes, new markers of myocardial infarction. Heart failure: definition, biochemical-clinical alterations, diagnosis and role of circulating biomarkers
5	Metabolism of glucose: Diabetes: biochemistry of DMT1 and DMT2; biochemistry of diabetes complications; clinical biochemistry diagnostics Hypoglycemia: clinical biochemistry
3	Clinical Biochemistry of Liver Diseases. Bilirubin metabolism and clinical biochemistry diagnosis of jaundice.
2	Celiac disease: from definition to pathogenesis, to diagnostic algorithms in symptomatic and asymptomatic patients.
2	Calcium and Vitamin D metabolism. Diagnostic algorithm of hyper- and hypocalcemia
3	Metabolism of thyroid hormones. Clinical biochemistry of hyperthyroidism, thyrotoxicosis and hypothyroidism.