



# UNIVERSITÀ DEGLI STUDI DI PALERMO

<b>DEPARTMENT</b>	Biomedicina, Neuroscienze e Diagnostica avanzata		
<b>ACADEMIC YEAR</b>	2022/2023		
<b>MASTER'S DEGREE (MSC)</b>	DIAGNOSTIC TECHNICAL HEALTH PROFESSIONS		
<b>INTEGRATED COURSE</b>	INTERDISCIPLINARY PROFESSIONALIZING PATH II - INTEGRATED COURSE		
<b>CODE</b>	22309		
<b>MODULES</b>	Yes		
<b>NUMBER OF MODULES</b>	3		
<b>SCIENTIFIC SECTOR(S)</b>	MED/07, BIO/12, MED/46		
<b>HEAD PROFESSOR(S)</b>	FERRARO DONATELLA	Professore Associato	Univ. di PALERMO
<b>OTHER PROFESSOR(S)</b>	CAPRA GIUSEPPINA	Professore Associato	Univ. di PALERMO
	MODICA CHIARA	Ricercatore a tempo determinato	Univ. di PALERMO
	BELLIA CHIARA	Professore Associato	Univ. di PALERMO
<b>CREDITS</b>	9		
<b>PROPAEDEUTICAL SUBJECTS</b>			
<b>MUTUALIZATION</b>			
<b>YEAR</b>	2		
<b>TERM (SEMESTER)</b>	1° semester		
<b>ATTENDANCE</b>	Mandatory		
<b>EVALUATION</b>	Out of 30		
<b>TEACHER OFFICE HOURS</b>	<p><b>BELLIA CHIARA</b>  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> <p><b>CAPRA GIUSEPPINA</b>  Tuesday 12:00 13:00 PROSAMI Via del vespro 133</p> <p><b>FERRARO DONATELLA</b>  Tuesday 13:00 14:00 Dipartimento Promozione della salute, Materno Infantile, di Medicina Interna e Specialistica di Eccellenza "G D'Alessandro", Via del Vespro 133, Piano 2°</p> <p>Thursday 13:00 14:00 Dipartimento Promozione della salute, Materno Infantile, di Medicina Interna e Specialistica di Eccellenza "G D'Alessandro", Via del Vespro 133, Piano 2°</p> <p><b>MODICA CHIARA</b>  Tuesday 11:00 15:00 Via del vespro 131</p>		

**MODULE  
CLINICAL BIOCHEMISTRY**

*Prof.ssa CHIARA BELLIA*

**SUGGESTED BIBLIOGRAPHY**

M. Ciaccio. Trattato di Biochimica Clinica e Medicina di Laboratorio. EdiSES, 2021.  
M. Ciaccio. Clinical and Laboratory Medicine Textbook. Springer, 2022.

<b>AMBIT</b>	20412-Scienze biomediche
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<b>INDIVIDUAL STUDY (Hrs)</b>	51
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<b>COURSE ACTIVITY (Hrs)</b>	24
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**EDUCATIONAL OBJECTIVES OF THE MODULE**

The main objective of the Clinical Biochemistry course is to allow the student, in the context of the professionalizing interdisciplinary path, to deepen the necessary theoretical and practical knowledge that allows him to critically evaluate both the methodologies relevant to Clinical Biochemistry and the meaning of the data to be obtained in relation to the various pathological conditions. The student must be trained to be a health professional and through an adequate professional activity, which integrates practical internship experiences with tutorial activities, to express advanced assistance and research skills related to biomedical and biotechnological analyzes. In particular, in the context of clinical biochemistry, the student must be able to plan and advise the clinician on the tests and the suitable implementation methodologies in relation to the diagnostic hypothesis, to give an appropriate interpretation of the results by critically correlating them with the molecular and biological events induced by the pathological condition, mastering the techniques and procedures of health management and the ability to access clinical biochemical data as a diagnostic tool, also with a view to multi-professional integration.

**SYLLABUS**

<b>Hrs</b>	<b>Frontal teaching</b>
2	The role of laboratory medicine in the clinical context. Integration between laboratory and clinic. Appropriateness in Laboratory Medicine. Precision medicine. The laboratory diagnostic process. Laboratory information and diagnostic reasoning. Methods for improving the laboratory diagnostic process. Quality and outcome indicators.
3	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 - colorimetry, turbidimetry, nephelometry, fluorimetry, atomic absorption and emission, potentiometric electrochemical techniques, kinetic reactions, electrophoresis, immunoelectrophoresis, immunofixation, immunochemical analysis with monoclonal antibodies, isoelectric focusing, chromatography, radioimmunoassay, count cell, flow cytometry, clinical microscopy, mass spectrometry, HPLC, molecular biology and recombinant DNA technologies, multiple analyzers, magnetic resonance spectroscopy, PET.
2	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. Methodological approaches in Clinical Biochemistry. The main analytical techniques, automation in Clinical Biochemistry.
3	Metabolism of glucose: Diabetes. Biochemistry of Type 1 Diabetes Mellitus and Type 2 Diabetes Mellitus. Biochemistry of diabetes complications. Clinical biochemistry diagnostics (serum glucose, urine glucose, insulin, C-peptide, glucagon, cortisol, GH, glycated proteins and their significance, OGTT, ketone bodies in serum and urine, lactic acid, piruvic acid, dyslipidemia in diabetic patients, urine test in diabetic patients). Hypoglycemia: clinical biochemistry. Laboratory tests to monitoring pregnancy.
2	Metabolism of lipids: Fatty acids, cholesterol, HDL-cholesterol, LDL-cholesterol, tryglicerides, phospholipids. Lipoproteins. Small dense low density lipoprotein particles. Dyslipidemia. Hypercholesterolemia. Atherosclerosis and cardiovascular diseases. Metabolic syndrome. Myocardial infarction: risk factors, biochemical modification in the necrotic area, clinical enzymes, new markers of myocardial infarction. Stroke. Biomarkers in heart failure. Thrombophilia.
2	Metabolism of proteins. Electrophoresis of serum proteins: interpretation of results. Laboratory evaluation of kidney function. Clinical biochemistry of kidney disease. Urinalysis.
2	Clinical biochemistry of gastrointestinal hormones. Chronic Inflammatory Bowel Diseases (IBD). Stool examination. Microbiome analysis and associations with human pathologies. Biochemistry of nutrition and its surveillance. Laboratory Exercise Medicine. Clinical biochemistry of hyperthyroidism, thyreotoxicosis, hypothyroidism.
1	Procedures for a correct blood collection. Types of test tubes and their specific use. Clinical biochemistry of acid base balance. Arterial blood gas (ABG): interpretation and reporting.
2	Clinical Biochemistry of liver diseases. Clinical biochemistry of exocrine pancreas. Clinical Biochemistry of heme metabolism. Clinical Biochemistry of autoimmune diseases (Celiac disease). Laboratory diagnostics of allergic diseases.
1	Diagnosis of central nervous system (CNS) Diseases. Clinical biochemistry of the cerebrospinal fluid. Clinical Biochemistry of Alzheimer's Disease and other Neurodegenerative Dementias.

2	Inflammatory biomarkers. Sepsis biomarkers. The role of laboratory medicine in the COVID-19 pandemic. Preoperative examinations. Laboratory testing in Urgency/emergency. Biobank. Health Technology Assessment (HTA) in Laboratory Medicine.
2	Elements of biomedical laboratory organization. Organizational models of the laboratory network. The roles and duties of the analysis laboratory staff. Laboratory tests: definition, type, method of request. Units of measurement. The ideal characteristics of a biomarker. Diagnostic efficiency and efficacy. Safety in the laboratory.

**MODULE**  
**ORGANIZATIONAL AND MANAGERIAL MODELS OF TECHNICAL-DIAGNOSTIC SERVICES**

*Prof.ssa CHIARA MODICA*

**SUGGESTED BIBLIOGRAPHY**

<https://sibioc.it/>

Morandini M. Innovazione organizzativa in Medicina di Laboratorio. DOI:10.1007/s13631-014-0049-z. 2014

<b>AMBIT</b>	20416-* Scienze e tecniche di laboratorio biomedico
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<b>INDIVIDUAL STUDY (Hrs)</b>	51
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<b>COURSE ACTIVITY (Hrs)</b>	24
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**EDUCATIONAL OBJECTIVES OF THE MODULE**

The course aims to provide students with knowledge of the technical aspects and the organizational and structural models of the laboratory. The teaching provides the necessary knowledge for the management of pre-analytical, analytical and post-analytical laboratory processes, giving particular interest to the processes related to data management and the request for the report. The aspects of human resource management in the laboratory field will also be analysed.

**SYLLABUS**

<b>Hrs</b>	<b>Frontal teaching</b>
3	Central role of Laboratory Medicine.
3	Contribution of laboratory tests for the improvement of health and care system.
4	Management of pre-analytical, analytical and post-analytical processes.
4	Data management and report request.
4	Human resources management.
3	Organizational innovation in Laboratory Medicine.
3	Critical assessment of departmental management level and evaluation of the efficiency of operational processes.