



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Biomedicina, Neuroscienze e Diagnostica avanzata		
ACADEMIC YEAR	2020/2021		
BACHELOR'S DEGREE (BSC)	BIOMEDICAL LABORATORY TECHNIQUES		
INTEGRATED COURSE	GENERAL PATHOLOGY AND PATHOPHYSIOLOGY - INTEGRATED COURSE		
CODE	05554		
MODULES	Yes		
NUMBER OF MODULES	2		
SCIENTIFIC SECTOR(S)	MED/04, MED/46		
HEAD PROFESSOR(S)	STASSI GIORGIO	Professore Ordinario	Univ. di PALERMO
OTHER PROFESSOR(S)	ACCARDI GIULIA	Ricercatore a tempo determinato	Univ. di PALERMO
	STASSI GIORGIO	Professore Ordinario	Univ. di PALERMO
CREDITS	6		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	2		
TERM (SEMESTER)	1° semester		
ATTENDANCE	Mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	<p>ACCARDI GIULIA</p> <p>Tuesday 15:00 16:00 Sezione di patologia generale, Corso Tukory 211, 90134, Palermo</p> <p>Friday 12:00 14:00 Sezione di patologia generale, Corso Tukory 211, 90134, Palermo</p> <p>STASSI GIORGIO</p> <p>Wednesday 10:00 13:00 Laboratorio di Fisiopatologia Cellulare e Molecolare del Dipartimento di Discipline Chirurgiche e Oncologiche con sede in via del Vespro, n. 131 90127 Palermo.</p>		

PREREQUISITES	Basic knowledge of cell biology, molecular biology, structure and function of nucleic acids and proteins, cytology and histology, anatomy, chemistry
LEARNING OUTCOMES	Knowledge and understanding: the student will need to know the main techniques of cytology, histology, immunohistochemistry, molecular biology, clinical biochemistry and diagnostics to be applied to the study of neoplastic and non-neoplastic samples. Acquiring the skills needed to understand the etiopathogenetic and pathological mechanisms of diseases and alterations in structures, functions and control mechanisms at various levels of integration. Ability to apply knowledge and understanding: the student must be aware of proper sample management in order to obtain the best technical results that will allow proper anatomopathological diagnosis. To this end, it will need to know all the causes of possible laboratory artifacts that can be the cause of diagnostic "pitfalls" and will know the repercussions of these in the patient's clinical management in order to be able to implement a proper strategy to avoid them. Assessment autonomy: the student will need to know the parameters to evaluate the suitability of the prepared preparations according to the various methods and to understand the fundamental role of the technician in the proper management of the laboratory.
ASSESSMENT METHODS	The evaluation will be made via oral test. The sufficiency threshold will be reached if the student shows knowledge and understanding of the issues at least in broad outline, and has application skills sufficient; he must also have presentation and argumentative skills allowing the transmission of his knowledge to the examiner. Below this threshold, the examination will be insufficient. The more the candidate will be able to interact with the examiner with his argumentative and presentation skills, and the more his knowledge and application capabilities will go into detail on the subjects under evaluation, the more the judgement will be positive. The evaluation is expressed using a 30-point scale. ECTS grades: A – A+ Excellent (30-30 cum laude) - Grade descriptors : Excellent knowledge of teaching contents; students should show high analytical and synthetic capabilities and should be able to apply their knowledge to solve highly complex problems. ECTS grade : B Very good (27-29) - Grade descriptors: Good knowledge of the teaching contents and excellent language control; students should show analytical and synthetic skills and be able to apply their knowledge to solve problems of medium and, in some cases, even higher complexity. ECTS grade: C Good (24-26)- Grade descriptors: Good knowledge of teaching contents and good language control; the students should be able to apply their knowledge to solve problems of medium complexity ECTS grade: D Satisfactory (21-23)- Grade descriptors: Average knowledge of the teaching contents, in some cases limited to the main topic; acceptable ability to use the specific discipline language and independently apply the acquired knowledge. ECTS grade: E Sufficient (18-20) - Grade descriptors: Minimum teaching content knowledge, often limited to the main topic; modest ability to use the subject specific language and independently apply the acquired knowledge. ECTS grade: F Fail (1-17) - Grade descriptors: Lack of an acceptable knowledge of the main teaching content knowledge; very little or no ability to use the specific subject language and apply independently the acquired knowledge. Exam failed.
TEACHING METHODS	The course includes a total of 60 hours of frontal lessons.

MODULE
TECHNICAL SCIENCES OF LABORATORY MEDICINE 1

Prof. GIORGIO STASSI

SUGGESTED BIBLIOGRAPHY

- Spandrio. Biochimica Clinica Speciale, Piccin. 2006. ISBN:978-88-299-1720-4
- Federici. Medicina di Laboratorio. McGraw-Hill Education. EAN: 9788838629112.
- Ciaccio, Lippi. Biochimica clinica e medicina di laboratorio. Edises. EAN:9788879599580

AMBIT	10341-Scienze e tecniche di laboratorio biomedico
INDIVIDUAL STUDY (Hrs)	45
COURSE ACTIVITY (Hrs)	30

EDUCATIONAL OBJECTIVES OF THE MODULE

Acquisition of the fundamental notions (theoretical and practical) for the critical evaluation of the methodologies relevant to the Clinical Biochemistry, and of the meaning of the obtained data, in relation to the specific pathological conditions. The student must acquire the methodological and cultural bases, as well as sufficient experience to be able to decide when and whether to propose a specific exam or analysis and at the same time have the ability to access and interpret the biochemical data as a diagnostic tool.

In particular:

- knowledge of the main laboratory tests and of the biological, molecular and pathophysiological bases.
- correct use of tests in screening, diagnosis and staging and therapeutic procedures of pathologies.
- appropriate interpretation of the results and critical correlation with molecular and biological events induced by the disease.
- knowledge of genetic-molecular mechanisms and knowledge of the main clinical syndromes deriving from gene alterations.

SYLLABUS

Hrs	Frontal teaching
2	Introduction to laboratory medicine: type of biological samples, methods of collection and conservation. Biological and analytical variability, accuracy and precision, sensitivity and specificity, error classification, quality controls.
2	Biochemical-clinical aspects and laboratory diagnostics of genetic diseases. Main chromosomal alterations. Study of mutations by direct and indirect analysis.
3	Clinical molecular biology: DNA diagnostic techniques of the main genetic diseases. Applications of gene cloning. Promoters and reporter genes, transfection systems of mammalian cell lines, transient and stable expression.
2	Separation techniques: dialysis and ultrafiltration, gel, concentrators, centrifugation. Application in the clinical biochemistry laboratory.
4	UV-visible absorption spectrometry: characteristic of electromagnetic wave, electromagnetic spectrum, wave-matter interaction, electromagnetic transitions, absorption and emission, spectrophotometer, Lambert-Beer law, direct analysis, analysis with appearance or disappearance of absorption, kinetic analysis. Main applications.
3	Electrophoresis: definition, instrumentation, physical principles, components of an electrophoretic system, quantitative analysis. Main applications.
5	Nucleic acid extraction and amplification techniques: phenol-chloroform extraction and chromatography, principles of amplification, PCR, RT-PCR, PCR and genotyping. Real-time PCR: chemistry, quantification of nucleic acids in biological samples, allelic discrimination. Restriction enzymes and SNPs identification. Nucleic acid hybridization. Capillary electrophoresis in molecular biology. Digital PCR. Sanger sequencing, electropherogram reading, mutation identification. Next-generation sequencing.
4	Chromatographic techniques: principles of separation, partition coefficients, column efficiency, main components, isocratic and gradient elution, chromatographic peak. Thin-layer and paper chromatography, adsorption / distribution / ion exchange / molecular exclusion chromatography. Detection systems. Qualitative and quantitative analyzes.
2	Epigenetics principles. Use of genetic and epigenetic biomarkers in laboratory medicine. Diagnostic and prognostic biomarkers. Personalized medicine: liquid biopsy in monitoring malignancies.
3	Flow cytometry: physical principles, absorption and emission spectrum, flow cytometer components, quantitative analyzes. Main applications. Role of the main markers.

MODULE
GENERAL PATHOLOGY AND PATHOPHYSIOLOGY

Prof.ssa GIULIA ACCARDI

SUGGESTED BIBLIOGRAPHY

G.M. Pontieri - Elementi di patologia generale Ed 4, 2018 Piccin Nuova Libreria
Robbins e Cotran. Le basi patologiche delle malattie. Patologia generale. Vol. 1, 9 edizione 2017, EDRA
Sono inoltre a disposizione degli studenti le diapositive delle lezioni e articoli da riviste scientifiche

AMBIT	10341-Scienze e tecniche di laboratorio biomedico
INDIVIDUAL STUDY (Hrs)	45
COURSE ACTIVITY (Hrs)	30

EDUCATIONAL OBJECTIVES OF THE MODULE

Knowing the immune system and the defence strategies, the overall characteristics of innate and adaptive immunity.
Acquiring knowledge on the strategies maintaining the natural homeostasis and understanding the molecular mechanisms generating disease
Knowing the physiopathology of local and systemic inflammatory response, through the action of involved cells and mediators.
Knowing systemic pathology and disease of organ systems and the main diagnostic methodologies in the laboratory field.

SYLLABUS

Hrs	Frontal teaching
2	Innate immunity, receptors and defence strategy. The complement system. The phagocyte system
2	The adapted immunity: antigens and antibodies. T and B lymphocytes
2	The Major histocompatibility complex and the antigen presentation
2	Receptors and accessory molecules of lymphocytes. Activation and effector mechanisms of lymphocytes. Cytokines as soluble mediators of immune system, cytokine receptors
2	The inflammatory response, acute inflammation, vascular reactions, edema, exudate and transudate, plasma protein- and cell-derived inflammatory mediators. Morphologic patterns of acute inflammation.
2	Chronic inflammation, leukocyte recruitment to sites of inflammation, adhesion molecules and cellular infiltration, Outcome of inflammation and repair mechanisms
2	Systemic effects of inflammation, fever and acute phase reaction
2	Hypersensitivity reactions: classification, description of activation and effector mechanisms. Hypersensitivity of I and II type
2	Type III and IV hypersensitivity
2	Adaptation of cellular growth and differentiation: hypertrophy, hyperplasia, atrophy, metaplasia and dysplasia
2	The blood, composition, leukocytic formula, morphologic and functional characteristics of leukocytes. Hematopoiesis Anemias, classification of anemia according to underlying mechanism, hemolytic anemias, thalassemia syndromes, extracorporeal anemias, iron metabolism and related defects
2	Physiology of hemostasis, platelet activation, the coagulation cascade, the fibrinolytic system, hemostasis disorders, thrombosis and shock. The blood vessels, atherosclerosis, aneurysms, the heart, the blood pressure and its regulation, the arterial hypertension, the cardiac hypertrophy and the ischemic cardiopathies, angina, myocardial infarction
2	The lung, respiratory physiology, lung diseases, ARDS, emphysema, chronic bronchitis, asthma
2	The gastrointestinal tract, Helicobacter pylori gastritis, malabsorption syndromes and inflammatory bowel diseases. Pathophysiology of liver inflammation. hepatitis and viral hepatitis
2	The pancreas: endocrine and exocrine functions. The pathogenesis of the acute and chronic pancreatitis. Type I and II diabetes. The endocrine system, the hypophysis, the thyroid gland: hypo- and hyper-thyroiditis