



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Biomedicina, Neuroscienze e Diagnostica avanzata		
ACADEMIC YEAR	2023/2024		
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/46, MED/04		
HEAD PROFESSOR(S)	NOTO DAVIDE	Professore Associato	Univ. di PALERMO
OTHER PROFESSOR(S)	NOTO DAVIDE	Professore Associato	Univ. di PALERMO
CREDITS	6		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	2		
TERM (SEMESTER)	1° semester		
ATTENDANCE	Mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	NOTO DAVIDE Monday 14:00 15:00 Edificio 13a, AOUP "Paolo Giaccone, Il piano		

DOCENTE: Prof. DAVIDE NOTO

PREREQUISITES	Basic knowledge of cellular biology, molecular biology, and biochemistry to understand the pathogenetic mechanisms altering natural homeostasis and determining the onset of diseases and tumors.
LEARNING OUTCOMES	Knowledge and understanding: The students will know the pathogenetic mechanisms of diseases. Ability to apply knowledge and understanding: The student will be able to correctly apply diagnostic strategies in relation to the acquired knowledge on the etiology and pathogenesis of diseases Assessment autonomy: The student will demonstrate a critical approach with the correct application of the most recent technologies useful for the definition of diagnostic paths. Communication skills: The student will acquire the ability to describe diseases using appropriate terminology and to interact with other professional figures involved in diagnostic-therapeutic paths through efficient teamwork.
ASSESSMENT METHODS	The evaluation will be made via oral text. The sufficiency threshold will be achieved if the student shows knowledge and understanding of the issues at least in general outline, and has application skills sufficient; he must also have presentation and argumentative 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 in the detail on the subjects under evaluation, the more the evaluation will be positive. The evaluation is expressed using a 30-point scale, as reported in the following scheme. ECTS grade A-A + excellent (30 - 30 cum laude) - Grade descriptors: Excellent knowledge of teaching contents; students should demonstrate high analytical and synthetic abilities 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 teaching contents and excellent language properties; students should demonstrate analytical and synthetic abilities and should be able to apply their knowledge to solve problems of medium and, in some cases, even high complexity. ECTS grade C Good (24 - 26) - Grade descriptors: Good knowledge of the teaching contents and good language control. 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 teaching contents, in some cases limited to the main topics. Acceptable ability to use the specific language of the discipline and to apply autonomously the acquired knowledge. - ECTS grade E sufficient (18 - 20) - Grade descriptors: Minimum knowledge of teaching contents, often limited to the main topics. Modest capacity to use the specific language of the discipline and to independently apply the acquired knowledge. ECTS grade F Fail (1 - 17) - Grade descriptors: Lack of an acceptable knowledge of the main teaching contents. Very little or no ability to use the specific language and to independently apply the acquired knowledge. Exam failed.
TEACHING METHODS	The course includes a total of 60 hours of frontal lessons.

MODULE
GENERAL PATHOLOGY AND PATHOPHYSIOLOGY

SUGGESTED BIBLIOGRAPHY

Elementi di Patologia generale e Fisiopatologia Generale, G.M. Pontieri, IV edizione, Piccin (ISBN-10: 8829929123; ISBN-13: 978-8829929122).

Le basi dell'Immunologia, Fisiopatologia del sistema immunitario, A. K. Abbas, A. Lichtman, V edizione, Edra Masson (ISBN-10: 8821442551; ISBN-13 978-8821442551).

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	Introduction to the subject. To have a clear conception of homeostasis, disease, etiology and pathogenesis.
3	Blood and hematopoiesis. Morphological and functional characteristics of leukocytes.
7	Natural and specific immune response: cells and tissues of the immune system. Antigens, antibodies, complement system and MCH (I and II classes). Immunopathology and hypersensitivity reactions.
7	Acute inflammation: vascular modifications. Cellular and fluid phase mediators: preformed and newly formed mediators. Inflammation cells, adhesion molecules and cell migration. Exudate and exudate. Repair processes, repair tissue and wound healing. Nonspecific and granulomatous histophlogosis.
5	Systemic inflammation and its manifestations. The alteration of the leucocyte formula. Acute phase proteins. Electrophoresis of plasma proteins. The febrile and non-febrile hyperthermias. Disease behaviour.
2	The anaemias: pathogenetic classification and laboratory diagnosis. Thalassaemic syndromes. Polycythaemias.
4	Pathophysiology of the cardiovascular system: sepsis, blood pressure and atherosclerosis. Pathophysiology of the digestive system: Helicobacter pylori gastritis, malabsorption syndromes and inflammatory bowel disease. Pathophysiology of the thyroid: hyper- and hypothyroidism. Pancreatic pathophysiology: acute and chronic pancreatitis, type I and II diabetes.

MODULE
TECHNICAL SCIENCES OF LABORATORY MEDICINE 1

Prof. DAVIDE NOTO

SUGGESTED BIBLIOGRAPHY

- Principi di patologia generale Oncologia molecolare. Autori: Stassi-Mattiolo. Medical books, 2018. ISBN:9788880341062.
- Immunologia. Autori: Coico, Sunshine, Benjamini. 2005. ISBN: 8879593072.

AMBIT	10341-Scienze e tecniche di laboratorio biomedico
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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

Acquisition of the knowledge required to understand the etiopathogenetic and pathological mechanisms of human neoplasms with particular attention to genetic alterations and the immune system.

SYLLABUS

Hrs	Frontal teaching
4	Introduction to tumor study. Definition of tumor and general characteristics of the mechanisms that regulate tumor progression. Benign and malignant tumors (examples and histopathological features). Risk factors. Nomenclature and classification of tumors (Dukes, TNM, Stage).
4	Epidemiology of tumors: descriptive (morbidity, mortality, prevalence, incidence), analytical (anamnesic and prospective method), molecular. Epidemiological data on tumors in Italy and worldwide. Factors influencing incidence and mortality. Survival and risk factors.
4	Genetic cancer risk; oncogenes: definition of oncogene; families of oncogenes and their products; oncogenes encoding growth factors; oncogenes encoding proteins related to growth factor receptors; oncogenes encoding cytoplasmic protein kinases.
4	Tumor suppressor genes: definition of tumor suppressor genes; the intuition of the existence of tumor suppressor genes; identification of tumor suppressor genes; rb1 gene and the main functions of its product involved in retinoblastoma; brca1 and brca2 genes involved in breast cancer; nf1 and nf2 genes and the main functions of their products; fap gene, involved in familial adenomatous polyposis and the main functions of its product, wnt and its functions in self-renewal.
4	Morphological aspects of neoplastic cell: morphological characteristics of tumors. Increase of cell mass: hypertrophy, hyperplasia, atrophy, aplasia (causes and examples); angiogenesis; VEGF / VEGFR; VEGF / VEGFR expression regulators; regulation of angiogenic processes by tumor cells. Metastasis; the metastatic cascade; possible ways of metastasis; metastatic sites.
4	Cell-cell adhesion molecules; integrins and intracellular pathways; cell adhesion molecules; degradation of the extracellular matrix; metalloprotease; cell invasion and migration; metastatic models (filter theory, seed and soil theory - seed and soil); role of TGF-beta; role of the tumor microenvironment (structural and cellular components); cancer associated fibroblasts (CAFs); anti-angiogenic therapy; bevacizumab; sorafenib; combinatorial therapies; resistance mechanisms.
3	Immune system and cancer: immunosurveillance; immunoediting (elimination, balance and escape); innate and adaptive immunity.
3	NK cell; class I and II MHC; tumor antigens; tumor infiltrating cells; macrophages associated with the tumor; tumor vaccines; therapeutic protocols, CAR-T.