



# UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Medicina di Precisione in area Medica, Chirurgica e Critica		
ACADEMIC YEAR	2022/2023		
BACHELOR'S DEGREE (BSC)	DENTAL HYGIENE		
INTEGRATED COURSE	BIOLOGY AND PHYSIOLOGY- INTEGRATED COURSE		
CODE	18973		
MODULES	Yes		
NUMBER OF MODULES	2		
SCIENTIFIC SECTOR(S)	BIO/13, BIO/09		
HEAD PROFESSOR(S)	MUDO' GIUSEPPA	Professore Ordinario	Univ. di PALERMO
OTHER PROFESSOR(S)	CONIGLIARO ALICE	Professore Associato	Univ. di PALERMO
	MUDO' GIUSEPPA	Professore Ordinario	Univ. di PALERMO
CREDITS	7		
PROPAEDEUTICAL SUBJECTS	19981 - ANATOMY WITH ELEMENTS OF HISTOLOGY		
MUTUALIZATION			
YEAR	1		
TERM (SEMESTER)	1° semester		
ATTENDANCE	Not mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	<p><b>CONIGLIARO ALICE</b>  Monday 15:00 18:00 Sezione di Biologia e Genetica del Dipartimento BiND in via Divisi 83, oppure attraverso la piattaforma TEAMS. A causa di possibili impegni istituzionali o riunioni di lavoro potrebbe non essere possibile ricevere gli studenti nel giorno e alle ore indicate, pertanto sarebbe preferibile fissare un appuntamento tramite e-mail.</p> <p><b>MUDO' GIUSEPPA</b>  Monday 00:00 00:01 Previo accordo</p>		

<b>PREREQUISITES</b>	Knowledge of the principles of physics , biophysics and biochemistry useful to the cells and physiology of the organs understanding.
<b>LEARNING OUTCOMES</b>	<p><b>KNOWLEDGE AND UNDERSTANDING</b> At the end of the integrated course students will develop a knowledge of the fundamental biologic processes of living organisms and the modalities with which inheritance characters are transmitted between generations, structural components of the human body, systems, and an understanding of the main aspects of the functioning of cells, organs and apparatus. Students will develop the ability to organize an integrated vision of the main functions of the body and will understand the responses of adaptation of the organ or apparatus in different functional conditions, with particular attention to the stomatognathic apparatus. Students will be familiar with the main functions of the CNC in motor and sensory processes. Overall, they will have an understanding of the integrated relationship between the nervous system and the functioning of the organs with particular attention to the stomatognathic apparatus.</p> <p><b>APPLYING KNOWLEDGE AND UNDERSTANDING</b> Students will acquire a comprehensive understanding of the human body with an integrated vision of organs and apparatus, and in particular a capacity to apply in their dental hygienist's profession the understanding of the functional structures of the human body, with particular attention to the structures involved in the function of buccal cavity . Students will be able to use this knowledge directly as a basis for advancing in the study of the pathophysiological mechanisms and the clinical-instrumental features of the major diseases of dental hygienist.</p> <p><b>EVALUATION AUTONOMY</b> Students will be able to evaluate and address in a rational and independent way the problems of functioning of organs and apparatus involved in chewing and therefore in the function of the teeth. Students will develop the ability to correlate the morpho-functional data acquired with the interpretation of the disorders of the organs involved with chewing.</p> <p><b>COMMUNICATION SKILLS</b> Students will develop the ability to communicate and disseminate clear and autonomy, both in their professional and non-professional responsibilities, the knowledge acquired during the course, and ability to communicate ideas, problems and solutions related to such knowledge.</p> <p><b>LEARNING ABILITY</b> Students will develop mastery of basic skills learned in the course, which will allow them to fully pursue the later stages of the studies, and update capabilities and deepening of the knowledge in order to improve the overall approach to their professional responsibilities.</p>
<b>ASSESSMENT METHODS</b>	<p><b>ORAL EVALUATION</b> The oral examination will take place with the formulation of two to three general questions on the topics covered in the course and described in the teaching program. The test will verify the degree of student learning, its ability to integration of knowledge and range of opinions on the learned knowledge. Will be assessed clarity in exposing the subjects learned and the property of language. Particular attention will be reserved for topics characterizing the degree course. The vote is expressed in thirty (30/30)</p> <p><b>RULES WITH WHICH THE FINAL EVALUATION IS FORMULATED</b> To pass the exam, then get a score of not less than 18/30 (E - Sufficient), the student must demonstrate elementary achievement of the goals. The achieved goals are considered elementary when the student demonstrates that he has acquired a basic knowledge of the topics described in the teaching program, is able to operate with minimal links between them, proves to have acquired a limited degree of autonomy; his language is enough to communicate with the examiners.</p> <p>To achieve a score of 30/30 and praise (A – A+ Excellent), the student must demonstrate that he has achieved the objectives set out in an excellent way. The goals achieved are considered excellent when the student has acquired the full knowledge of the subjects of the teaching program, demonstrates how to apply the acquired knowledge also in different/new/advanced contexts in respect to those of the teaching itself, he expresses lexical competence also within the specific reference language and is also able to elaborate and express independent judgments based on acquired knowledge.</p> <p>The test is insufficient, so the exam is not passed when the student does not have an acceptable knowledge of the contents of the topics covered in the teaching, and his language is insufficient to communicate with the examiners.</p>

<b>TEACHING METHODS</b>	Frontal lessons
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## MODULE APPLIED BIOLOGY

*Prof.ssa ALICE CONIGLIARO*

### SUGGESTED BIBLIOGRAPHY

P. Bonaldo, C. Crisafulli, R. D'Angelo, M. Francolini, S. Grimaudo, C. Rinaldi, P. Riva, M.G. Romanelli "Elementi di Biologia e Genetica" EdiSES Editore, prima edizione. ISBN 9788833190389

C. Donati, M. Stefani, N. Taddei "Biologia & Genetica" Zanichelli Editore, prima edizione. ISBN: 9788808520524

<b>AMBIT</b>	10338-Scienze biomediche
<b>INDIVIDUAL STUDY (Hrs)</b>	45
<b>COURSE ACTIVITY (Hrs)</b>	30

### EDUCATIONAL OBJECTIVES OF THE MODULE

Distinguish prokaryotic and eukaryotic cell. Identify the main biological structures, the organization and functioning of a eukaryotic cell. Analyze the flow of the genetic information and the mechanisms of gene expression in prokaryotes and eukaryotes. Analysis and comparison of genomic stability and variability. Main mutation type. Understanding genetic inheritance modes and genotype-phenotype relationship. Genetic inheritance in humans. Modes of transmission of wild type and mutated genes.

## SYLLABUS

Hrs	Frontal teaching
4	Structural and functional cell organization. Prokaryotic and eukaryotic cells. Citomembrane: organization and functional examples
6	The flow of the genetic information, from DNA to proteins. The RNAs. Transcription and translation processes.
4	The regulation of gene expression in eukaryotes.
2	Cell communication and signal transduction.
2	The Cell Cycle
2	DNA replication.
2	Mitosis, meiosis and gametogenesis in humans.
4	Mendelian inheritance rules: dominant and recessive phenotypes, Law of Segregation, Law of Independent Assortment. Non-Mendelian inheritance: co-dominance, incomplete dominance, multiple alleles, polygenic traits.
4	Human genetic: genotype and phenotype. Genetic inheritance in humans. Modes of transmission. Hereditary metabolic disorders.

## MODULE HUMAN PHYSIOLOGY

*Prof.ssa GIUSEPPA MUDO'*

### SUGGESTED BIBLIOGRAPHY

I testi sotto descritti sono indicativi. Qualsiasi testo di fisiologia e' ammesso per lo studio, purché sia sufficientemente chiaro nell'esposizione dei concetti e non renda lo studio particolarmente pesante per la prolissità degli argomenti trattati.

The books below are indicative. Any physiology book is admitted for study, provided it is sufficiently clear in the exposition of concepts and does not make the study particularly heavy for the proliferation of the topics discussed

Autori vari - Fisiologia umana. Fondamenti. Con e-book e espansione online. ISBN: 8870515443. I ediz. EdiErmes ed.

D.U Silverthorn - Fisiologia Umana- Un approccio integrato. VIII Ed. Pearson Italia. ISBN:9788891909732

Diego Manzoni, Eugenio Scarnati - Fisiologia orale e dell'apparato stomatognatico - I ediz. EdiErmes ed. ISBN: 8870512592

Saranno forniti agli studenti dispense specifiche agli obiettivi del corso. Sarà inoltre fornito materiale didattico in formato digitale per perfezionare lo studio sugli argomenti del corso.

Booklets will be provided to students, specific to the course objectives. It will also provide teaching material in digital format to improve the study on the course subjects.

<b>AMBIT</b>	10338-Scienze biomediche
<b>INDIVIDUAL STUDY (Hrs)</b>	60
<b>COURSE ACTIVITY (Hrs)</b>	40

### EDUCATIONAL OBJECTIVES OF THE MODULE

The aim of the course is to put the student in the knowledge of the basics of the functioning of the main organs and apparatus of the human body, with particular attention to the stomatognathic system. Know how to respond to adaptive responses and the main mechanisms of integrated regulation of the various devices, with a focus on integrated control of the central nervous system and the organs involved in chewing and physiology of the teeth.

## SYLLABUS

Hrs	Frontal teaching
2	General organization of physiological functions - Levels of integration of physiological functions (organs, tissues, cells ). Concept of internal compartment . Water compartments of the body. Diffusion, passive and active transport of solutes and solvents. Membrane physiology Biological membranes. Dissemination through channels. Carrier-mediated transport. Active transport. Transepithelial transport. Endocytosis and exocytosis.
2	Physiology of the nervous system - Notions of neuronal excitability and action potential, synapses and neurotransmitters.
9	Sensory functions: Anatomic-functional organization of the SNC. General mechanisms of sensory receptors. Structure and mode of activation of skin receptors. Anatomical-functional organization of tactile, thermal and painful sensitivity. Sensitive paths. Trigeminal sensitivity. Pain perception. Mechanisms of taste and smell. Gustative sensitivity: flavors, taste receptors, stimulation and transduction mechanisms, Olfactory sensitivity: olfactory receptors and pathways; the smells. Vegetative nervous system. Morpho-functional VNS organization. VNS neuromodulators. Vegetative reflexes and their central integration
6	Cell contractility. Functioning of sarcomere and contractile proteins. Coupling excitation-contraction in the striated muscle. Morpho-functional characteristics of smooth muscle. Coupling excitation-contraction in smooth muscle. Muscle-skeletal control. Mechanical aspects of contraction of skeletal muscles. Motor nuclei and force modulation. Physiological tetanus. Isometric and isotonic contractions. Proprioception. Stretching spinal reflexes. Flexor reflexes. Spontaneous motor functions. Voluntary movements and their integration. Tendon and joint muscular proprioceptors: Muscle spindles, Golgi tendon organs.
3	Physiology of digestive apparatus - Morpho-functional organization of digestive apparatus, gastric activity and its regulation. Small intestine, large intestine, pancreas and liver functions. Digestion, absorption and utilization of nutrients.
7	Physiology of the stomatognathic system. Structure of salivary glands. Salivation: Dynamic and composition of salivary secretion, salivary secretion regulation. Physiology of the chewing apparatus. Chewing: bone, joint, occlusal, muscular and nervous factors. Control of chewing, forces developed during chewing. Anatomy and physiology of swallowing: oral , pharyngeal and esophageal phases; Nerve control of swallowing.
3	Physiology of the kidney - Glomerular ultrafiltration. Tubular functions. Kidney controls of fluid and electrolyte balance, blood pressure and pH. Urination.

3	<p>Cardiocirculatory system. Large and small circulatory system. Vascular function generalities. Heart cycle phases and valve movements. Pressory and volumetric variations in cardiac chambers and large arteries. Cardiac pacemaker and cardiac excitation propagation. Specific functions of arteries and arterioles. Capillary and vein functions. Blood Pressure control. Circulatory effects on orthostatism. and clinostatism . Blood: morpho-functional organization, formation and composition of plasma, morphology and functions of corpuscular constituents.</p>
3	<p>Respiratory systems: Respiratory Muscle. Pleural and dynamic pressure of the thoraco-lung system . Gas exchange in the alveoli and tissues. Transportation of gas in the blood. Upper respiratory tract. Control of respiratory function.</p>
2	<p>Physiology of mineralized tissues: ossification process; bone remodeling and repair of the. Calcium and phosphate metabolism and its adjustment. Hormone control of bone metabolism and body growth.</p>