UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze Psicologiche, Pedagogiche, dell'Esercizio Fisico e della Formazione		
ACADEMIC YEAR	2019/2020		
BACHELOR'S DEGREE (BSC)	PHYSICAL EDUCATION AND SPORT SCIENCES		
INTEGRATED COURSE	HUMAN PHYSIOLOGY - INTEGRATED COURSE		
CODE	03380		
MODULES	Yes		
NUMBER OF MODULES	2		
SCIENTIFIC SECTOR(S)	BIO/09		
HEAD PROFESSOR(S)	RUSSO GIUSEPPE	Ricercatore	Univ. di PALERMO
OTHER PROFESSOR(S)	RUSSO GIUSEPPE	Ricercatore	Univ. di PALERMO
CREDITS	12		
PROPAEDEUTICAL SUBJECTS	01542 - BIOCHEMISTRY		
MUTUALIZATION			
YEAR	2		
TERM (SEMESTER)	Annual		
ATTENDANCE	Not mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	**RUSSO GIUSEPPE** Monday 9:00 10:00 Previa prenotazione sull'email giuseppe.russo15@Unipa.it, l'incontro avverra su Teams:" canale ricevimento studenti Scienze Motorie Prof. Giuseppe Russo Fisiologia Umana".		

DOCENTE: Prof. GIUSEPPE RUSSO

PREREQUISITES	Knowledge of anatomy and biochemistry
LEARNING OUTCOMES	The course aims to give students a comprehensive and integrated vision of the human body, its of these control systems of organs, processes that do the work and mechanisms normal conditions. The topics require studio founded by the student not solely or mainly on the ability to remember (mnemonic), but a study rational, based on an understanding of the mechanisms and processes described and the ability to to relate the knowledge acquired. The storage of data will often be obliged, for example of the values of physiological parameters of the organism, some to consider, "crucial" but will aimed at understanding of the studied processes and their control in order homeostasis, fundamental notion of physiology and below to each topic. At the end of the course the student must demonstrate that they understand how the various organs of the human body, their inclusion in the equipment, the general control mechanisms of these under normal conditions.
ASSESSMENT METHODS	The exam is an oral exam aimed at verifying the competences and skills to be acquired at the end of the course. The purpose of the questions is to verify knowledge of contents to be acquired at the end of the course, as well as analytical and expository skills. Knowledge check includes scrutiny of the capability to establish relationships between contents, theories, patterns and methodologies which have been an object of study during the course. As far as analytical skills are concerned, check will aim at verifying that the student has achieved at least one of the following goals: - make judgements and opinions about the disciplinary contents - understand applications and\or implications of the disciplinary contents within the specific discipline of reference - set the disciplinary contents within the professional, technological and sociocultural setting of reference. The student will have to answer at least three questions in the oral form about aspects of the syllabus with reference to the suggested textbooks. The exam aims at verifying knowledge and understanding of topics, interpretative competence and autonomy of judgement of concrete cases. The passing grade threshold will be considered reached if the student shows to have acquired the topics of the specific subject matter and is able to solve specific concrete cases as well as to correctly convey knowledge with satisfactory expository skills. Below the above-mentioned threshold, the exam will be considered unsatisfactory. The more the student can interact with his examiner showing mastery of language, of the specific subject matter and ability to convey his\her knowledge of the topics of the specific field of reference, the more the assessment will be positive. The latter will be expressed by 18 to 30-30 with honours marks.
TEACHING METHODS	Frontal lessons. Number of hours reserved for tutored activities:96 PERIOD OF LESSONS: Second year (FIRST AND SECOND HALF)

MODULE
HUMAN PHYSIOLOGY I

Prof. GIUSEPPE RUSSO

SUGGESTED BIBLIOGRAPHY

Cindy Stanfield Fisiologia editore Edises

W. J. Germann, C. L. Stanfield Fisiologia EdiSES, Napoli, 2006 AA. VV.

AMBIT	50097-Biomedico
INDIVIDUAL STUDY (Hrs)	108
COURSE ACTIVITY (Hrs)	42

EDUCATIONAL OBJECTIVES OF THE MODULE

The course aims to give students a comprehensive and integrated vision of the human body, its of these control systems of organs, processes that do the work and mechanisms normal conditions.

SYLLABUS

Hrs	Frontal teaching
5	Skeletal and muscle contraction muscle. contractile component. elastic component. Structure of myofibrils. Structure of actin and myosin filaments. Interaction actin and myosin, and ATP hydrolysis: biochemical cycle of ATP splitting and mechanical cycle of actin-myosin interaction.
4	Regulatory role of proteins troponin and tropomyosin the sliding of the filaments. Shock simple. Isometric and isotonic contractions. Summation of simple shock, clonic and tetanic contractions. force-velocity relationship. live report (active and passive) and length.
6	The motor unit. neural mechanisms of the force of contraction graduation (frequency and recruitment code). Mechanism of recruitment of motor units (principle of size Henneman). functional specialization of the motor units; histochemical classification of muscle fibers; Functional classification of motor units; mechanisms responsible for the functional specialization of the motor units.
2	Heart muscle. structural, mechanical and electrophysiological. common features and differences from skeletal striated muscle. Smooth muscle. structural, mechanical and electrophysiological. Distribution and innervation. common features and differences from striated muscle.
6	MOTOR FUNCTIONS General organization of motor systems (reflex movements, rhythmic automatic, volunteers). Integration of sensory information with the engine controls. Motor functions of the spinal cord. Definition and general properties of spinal reflexes somatic (skeletal muscle). Elements of spinal reflexes. deep somatic reflexes (of muscle origin): reflection of the muscle spindle (by stretching or myotatic); neural circuits implicated in the stretch reflex; gamma motor neurons and their control over the muscle spindles; functions of the stretch reflex in the control of muscle tone and during the execution of the movements. Circuits reflexes activated organ muscles and tendons of the Golgi. superficial somatic reflexes (of cutaneous origin). The flexion reflex or nociceptive: neuronal circuits and properties.
2	Spinal interneurons and property mutual innervation (single and double). Axon reflex. plant generators of rhythmic motor patterns; notes on the spinal centers of locomotion. Consequences of the cross-section of the spinal cord, "spinal shock."
4	Motor functions of the brainstem. Functional anatomy of the brain stem; ascending and descending functions of the reticular formation. Mechanisms of postural tone control; animal decerebration and extensor rigidity. Reflections truncated encefalici with particular reference to the origin of vestibular reflexes.
4	Motor functions of the cerebral cortex, basal ganglia and cerebellum. primary motor area and secondary motor areas (supplementary motor area, the premotor cortex).
1	Cerebellum: neuronal circuits of the cerebellar cortex. The role of the cerebellum in learning motor. cerebellar functional divisions; main afferent and efferent of the cerebellum; the vestibule functions, the thorny and cerebro-cerebellum. Basal ganglia: anatomical composition, neuronal circuits.
2	RESPIRATORY ventilation-perfusion mismatch. "Average" relationship. Distribution of ventilation, perfusion and their relationship in the lungs. Causes and consequences of an altered ventilation / perfusion ratio. physiological mechanisms of compensation. alveolar diffusion. Factors that control the alveolar gas diffusion (gas properties, geometric characteristics of the alveolar-capillary membrane). pulmonary diffusing capacity for O2 (DLO2): meaning and methods of measurement.
2	Transportation of respiratory gases in the blood. Transport of O2 - Henry's Law and hemoglobin saturation curve with oxygen. Factors that modify the affinity of hemoglobin for oxygen. CO2 transport. chemical reactions of CO2 in the blood. of blood dissociation curve for carbon dioxide.

2	Breathing tissue. Supply, extraction and consumption di'ossigeno by the tissues: mechanisms of regulation.
2	Breathing control. Control bulb-pontine breathing. Genesis of the respiratory rhythm. peripheral mechanisms. mechanical factors (receptors of the respiratory muscles and their reflections; airway receptors and related reflex; reflex Hering - Breuer. Chemical factors (peripheral chemoreceptors and PO2 effects, PCO2 and pH). Other factors that regulate breathing (somatic afferent and visceral; pain; exercise; sleep).central mechanisms - central chemoreceptors, signs of central influences "non-chemical".

MODULE
HUMAN PHYSIOLOGY II

Prof. GIUSEPPE RUSSO

SUGGESTED BIBLIOGRAPHY

Cindy Stanfield Fisiologia editore Edises

D. U. Silverthorn Fisiologia Umana. Un approccio integrato Edizione Italiana a cura di Vellea Franca Sacchi Editore Pearson

AMBIT	50100-Biologico
INDIVIDUAL STUDY (Hrs)	108
COURSE ACTIVITY (Hrs)	42

EDUCATIONAL OBJECTIVES OF THE MODULE

The course aims to give students a comprehensive and integrated vision of the human body, its of these control systems of organs, processes that do the work and mechanisms normal conditions.

SYLLABUS

Hrs	Frontal teaching
4	CARDIOVASCULAR Systemic circulation: pressure, volume, strength and speed in the various sections of the systemic circulation. circulatory filling pressure and its meaning. properties of the arteries. BP: trends, determinants, measurement and direct recording; indirect measurement; wrist arterial. Properties of the veins, central venous pressure, venous pulse, venous return.
4	Microcirculation: organization of the capillary network, mechanisms of trade at the level of capillaries, lymphatic drainage, local flow control, self-regulation. cardiovascular control mechanisms: general information on the control systems (negative feed-back). nerve centers of the cardiovascular control. nervous reflex control of blood pressure (short-term), arterial baroreceptors, atrial and pulmonary artery receptors, chemoreceptors, shares of SNV, humoral control, renal monitoring (long term).
6	Venous return and cardiac output. Methods of measurement of cardiac output. Mechanism of Franck - Starling and intrinsic regulation of cardiac output, extrinsic regulation. The pressure gradient in the venous return. Curves of the cardiac output and venous return as a function of the right atrial pressure. district circles: coronary circulation, brain, skin, muscle, hepatosplanchnic, kidney.
6	BODY FLUIDS AND RENAL FUNCTION The body fluids. Total body water. water balance. The body fluid compartments and their measurement. Constituents of the extracellular fluid (LEC) and intracellular. (LIC). maintain osmotic equilibrium between extracellular and intracellular fluids. Functional Anatomy of the kidney. renal circulation. nephron functions. urine formation: glomerular filtration, tubular function and purification of plasma. Glomerular filtration. Glomerular filtration rate (GFR). Factors that influence GFR.
4	The "plasma clearance" concept. The clearance of inulin as a measure of glomerular filtration rate. The clearance of paraminoippurico (PAI) as a measure of blood flow through the kidneys. tubular function. reabsorption mechanisms and tubular secretion. Reabsorption and secretion of various substances in the various segments of the tubules. Tubular transport of: glucose, amino acids, urea, uric acid, Na +, K +, phosphate, HCO3 - and H + .Riassorbimento water. renal mechanisms for the concentration and dilution of urine.
4	ADH action. Kidney role in osmolarity control, the volume and composition of the blood and extracellular fluid. basic mechanisms for the control of blood volume and osmolarity. Control of the concentration of Na + in the extracellular fluid. Control of the extracellular K + concentration. Control of the extracellular concentration of other ions. acid-base regulation. The body fluid buffer systems. Respiratory acid-base regulation. Renal regulation of hydrogen ion concentration. Correction alkalosis and acidosis by the kidney. Urination. The micturition reflex.
6	The DIGESTIVE Functions and processes of digestion, gastro-intestinal absorption and their control. The nutrients and caloric acalorici. Buyers. The energy balance.
6	THE ENDOCRINE SYSTEM Adrenal glucocorticoids, thyroid hormones, growth hormone, insulin and glucagon
2	TEMPERATURE CONTROL.