

Course Title	Physiology			
Course Code	PHYS108			
Course Type	Compulsory			
Level	Bachelor (Level 1)			
Year / Semester	1 st / Spring			
Instructor's Name	Dr George Charalambous			
ECTS	6	Lectures / week	3	Laboratories/week
Course Purpose	<p>The main objectives of the course is to comprehend the physiological functions and homeostatic mechanisms of the systems of the human body. In addition, the aim of the course is for students to understand the mechanisms controlling the multifaceted and complex functional interdependence of the various systems of the human body as well as to familiarize with the physiological parameters of functioning and possible physiological deviations at the level of cell, tissue, organ and operating system.</p>			
Learning Outcomes	<p>Upon completion of the course, students are expected to be able to:</p> <ul style="list-style-type: none"> • know and describe the physiological functions and mechanisms of mutual regulation of the human body and delineate possible deviations from normal • know the function of nerve and muscle cells • understand the physiology of the respiratory, cardiovascular, nervous, musculoskeletal, and endocrine systems • understand the principles of physiology in the digestive and urinary tract • be able to describe the regulation of acid-base balance, temperature, blood sugar and blood pressure • describe the structure and function of the lymphatic system • perceive the differences in the types of muscle contraction and the regulatory role of the nervous system • understand the functional interdependence of the respiratory and cardiovascular systems, and the factors leading to pathology • describe the role of the sensory-motor system and its relationship with proprioception and balance regulation 			
Prerequisites	None	Co-requisites	None	

<p>Course Content</p>	<ul style="list-style-type: none"> • Introduction to Physiology. Cells, tissues, organs, organic systems. The internal environment and homeostasis. Transmembrane transport of dissolved substances and water. Structure and composition of the membrane. Endocytosis and extracytosis. Diffusion. Osmosis. Membrane transport mediated by protein – active and facilitated transport. • Nervous system. Organization of the nervous system. Central and peripheral system. Composition of neural tissue and microscopic structure of the neuron. Transmission of information. Neuromuscular connections. Resting membrane potential and the creation and conduction of energy potentials. Synaptic transmission. • General aesthetic system. Principles of aesthetic physiology – sensory receptors, stimulus, sensory coding (type and location of stimulus). Eye structure and physiological optics. Visual disturbances. • The autonomic nervous system and its regulation. Sympathetic and parasympathetic system. The autonomous functions and functions of the hypothalamus. • Muscles. Structure of muscle tissue. The unit of contraction. The circle of cross bridges. Isometric and isotonic contractions. Regulation of contraction and relaxation. Skeletal and smooth muscles. • The locomotor system. The motor unit – motor neurons. Synaptic integration and production of dynamic energy. Muscle elongation receptors, median neurons of the spinal cord and spinal reflexes. The control of posture and movement by the brainstem. Organization of descending motor pathways. Control of movement from the cortex, cerebellum and basal ganglia. • Blood. Blood components. Leukocytes, lymphocytes and blood groups. Hemostasis – vasoconstriction, platelet thrombus and blood clotting. • Circulation and the cardiovascular system. The electrical activity of the heart – cardiac energy potential, conduction in the heart fibers and cardiac excitability. Physical stimulation of the heart and return. Electrocardiography. • The cardiac pump – anatomical basis of cardiac function. Cardiac muscular cell, cardiac cavities and valves. Heart sounds and cardiac cycle. Measurement of cardiac output. Regulation of the heartbeat. • The arterial system. Arterial compliance. Factors that determine blood pressure. Measurement of blood pressure in humans. • The respiratory system. Respiratory movements. Respiration and impregnation. Blood gases transportation and gas exchange in tissues. Breathing control system. Transport of oxygen and carbon dioxide between lungs and body cells. • Renal function. Anatomy of the kidneys. Determination of renal function – glomerular filtration, reabsorption of substances from the tubular fluid into the blood and the secretion of substances from the blood into the tubular fluid. The role of the kidneys in the acid-base balance.
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	<ul style="list-style-type: none"> • Digestive system. Structure and irrigation of the gastrointestinal tract. Gastrointestinal motility control. General principles of physiology of the endocrine system. Synthesis, storage and secretion of hormones. Hormonal action. Reproductive function. Synthesis and regulation of sex steroid secretion. Age-related changes in reproduction and racial differentiation. Reproductive function of the male and female.
<p>Teaching Methodology</p>	<p>The course is delivered to the students through lectures, using computer-based presentations programmes. Case Studies, Discussion, Questions / Answers are also used depending on the content of the lecture. Lecture notes and presentations are available online for use by students in combination with textbooks. Relevant material published in international scientific journals is also used to follow the latest developments related to the subject of the course</p>
<p>Bibliography</p>	<p><u>Textbooks:</u></p> <p>Hall J. (2020). Guyton and Hall Textbook of Medical Physiology, 14th Edition, Elsevier</p> <p>McGeown, J.G. (2008). Synoptic Human Physiology. Paschalidis Publications.</p> <p>Berne, R.M. &Levy, M.N. (2004). Physiology Principles (Greek edition), Crete Editions.</p> <p>Smokovite, A. (2004). Physiology. Kyriakides Publications. Thessaloniki.</p> <p>Scott W. (2004) Anatomy & Physiology Made Incredibly Easy. (2nd Edition). Lippincott Williams & Wilkins, USA.</p>
<p>Assessment</p>	<p><u>Continuous Assessment (50%):</u></p> <p>The assessment may include any combination of the following:</p> <ul style="list-style-type: none"> • Written and/or oral, and it consists of multiple – choice, short answer, open ended questions and/or essay questions, that align with the learning outcomes, in order to assess the theoretical knowledge gained. The questions ensure that students will demonstrate a deep understanding of the subject matter and apply their knowledge to solve problems or analyse scenarios. • Assignments and projects provide opportunities for students to apply their theoretical knowledge in practical ways. The assignments are designed in a way that require critical thinking, research, analysis, and synthesis of information. Projects can be individual, self directed learning or group-based and should align with the learning outcomes. Students are evaluated on the quality of their work, the depth of understanding displayed, and their ability to effectively communicate their ideas. Assignments and projects may be individual or group work. • Use of case studies or problem-solving exercises to assess how students can apply theoretical knowledge to real-life situations. Students are presented with scenarios that require analysis,

	<p>critical thinking, and the application of theoretical concepts and they are assessed based on their ability to perform verbal presentations, viva voce examinations, identify and evaluate relevant information, propose solutions, and provide justifications for their choices.</p> <ul style="list-style-type: none"> • Online quizzes or interactive assessments: Online quizzes or interactive assessments, reflective writing can be used through the Moodle platform, to create quizzes with various question formats. These assessments can be self-paced or timed, and immediate feedback can be provided to students. • Classroom discussions and debates: Students engage in classroom discussions and debates to assess their theoretical knowledge. Active participation is encouraged to hone their critical thinking skills by posing open-ended questions and facilitating dialogue. • Peer and self-assessment: Students are assigned to review and provide feedback on each other's work, encouraging them to critically evaluate their peers' understanding and provide constructive suggestions. <p>Final Exam (50%): comprehensive final exam, to assess students' overall theoretical knowledge. These assessments cover a broader range of topics and learning outcomes from the entire program of study, to gauge the students' understanding and integration of knowledge across different areas.</p>
Language	Greek / English