



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Biomedicina, Neuroscienze e Diagnostica avanzata		
ACADEMIC YEAR	2022/2023		
MASTER'S DEGREE (MSC)	MEDICINE AND SURGERY		
INTEGRATED COURSE	HUMAN PHYSIOLOGY - INTEGRATED COURSE		
CODE	03380		
MODULES	Yes		
NUMBER OF MODULES	3		
SCIENTIFIC SECTOR(S)	BIO/09		
HEAD PROFESSOR(S)	GIGLIA GIUSEPPE	Professore Associato	Univ. di PALERMO
	MUDO' GIUSEPPA	Professore Ordinario	Univ. di PALERMO
	FERRARO GIUSEPPE	Professore Ordinario	Univ. di PALERMO
OTHER PROFESSOR(S)	DI MAJO DANILA	Ricercatore	Univ. di PALERMO
	GIGLIA GIUSEPPE	Professore Associato	Univ. di PALERMO
	GAMBINO GIUDITTA	Ricercatore a tempo determinato	Univ. di PALERMO
	MUDO' GIUSEPPA	Professore Ordinario	Univ. di PALERMO
	SARDO PIERANGELO	Professore Ordinario	Univ. di PALERMO
	FERRARO GIUSEPPE	Professore Ordinario	Univ. di PALERMO
CREDITS	17		
PROPAEDEUTICAL SUBJECTS	01617 - BIOLOGY AND GENETICS - INTEGRATED COURSE 90402 - PHYSICS 17447 - CHEMISTRY AND BIOCHEMISTRY - INTEGRATED COURSE 17445 - HUMAN ANATOMY II - INTEGRATED COURSE 17708 - HUMAN ANATOMY I		
MUTUALIZATION			
YEAR	2		
TERM (SEMESTER)	1° semester		
ATTENDANCE	Mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	<p>DI MAJO DANILA Monday 9:30 13:30 Istituto di Fisiologia Umana, Corso Tukory 129 Wednesday 9:30 13:30 Istituto di Fisiologia Umana, Corso Tukory 129</p> <p>FERRARO GIUSEPPE Tuesday 11:00 13:00 Sezione di Fisiologia umana del Dipartimento BIONECC.so Tukory, 129Palermo Thursday 11:00 13:00 Sezione di Fisiologia umana del Dipartimento BIONECC.so Tukory, 129Palermo</p> <p>GAMBINO GIUDITTA Tuesday 10:30 12:30 Istituto di Fisiologia Umana, corso Tukory 129 Thursday 10:30 12:30 Istituto di Fisiologia Umana, corso Tukory 129</p> <p>GIGLIA GIUSEPPE Tuesday 16:40 18:40 Campus Universitario - Padiglione 11 CEPAS, via G. Mule,1 Caltanissetta Thursday 16:40 18:40 Campus Universitario - Padiglione 11 CEPAS, via G. Mule,1 Caltanissetta</p> <p>MUDO' GIUSEPPA Monday 00:00 00:01 Previo accordo</p> <p>SARDO PIERANGELO Monday 09:30 10:30 BiND- Sezione di Fisiologia umana - Corso Tukory, 129 - II piano</p>		

	SARDO PIERANGELO Friday 09:30 10:30 BiND- Sezione di Fisiologia umana - Corso Tukory, 129 - II piano
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DOCENTE: Prof. GIUSEPPE FERRARO- Sede *IPPOCRATE*

PREREQUISITES	Knowledge of biology, physics, anatomy and biochemistry
LEARNING OUTCOMES	<p>Students will have to develop an understanding of the main functioning mechanisms of organs and systems while developing the ability to organize an integrated view of the main functions of the organism.</p> <p>Ability to apply knowledge and understanding. Students will have to acquire the ability to organize an integrated view of the main functions of the organism as a basis for progress in the study of the pathophysiological mechanisms of the main pathologies. Students will also have to acquire the ability to apply the knowledge gained on the functioning of organs in medical practice and to understand possible functional adaptations.</p>
ASSESSMENT METHODS	<p>The evaluation takes place out of thirty following an oral exam.</p> <p>The oral exam will consist of an interview on the topics listed in this sheet. The exam will mainly be aimed at verifying: the degree of knowledge acquired on the functioning of the organs; the ability to understand the integrated functioning of organs; clarity of presentation; the ability to deepen the topics e acquisition of the technical language of the discipline.</p> <p>The evaluation of the oral exam will take place according to the criteria described below.</p> <p>The sufficiency threshold will be reached when the student shows knowledge and understanding of the topics at least in general lines and has sufficient application skills to solve simple concrete cases.</p>
TEACHING METHODS	Frontal lessons integrated with theoretical and practical activities

DOCENTE: Prof.ssa GIUSEPPA MUDO'- Sede *CHIRONE*

PREREQUISITES	Knowledges of Chemistry, Physics, Biology, Biochemistry, Anatomy
LEARNING OUTCOMES	<p>Students will have to develop an understanding of the main mechanisms of functioning of the organs and apparatus while developing the ability to organize an integrated view of the main functions body. Ability to apply knowledge and understanding. Students will have to acquire the ability to organize an integrated vision of the main ones functions of the body as a basis for progress in the study of physiopathological mechanisms of the main pathologies. Students must also acquire the ability to apply the knowledge acquired in medical practice on the functioning of the organs and to understand the possible adaptations functions.</p>
ASSESSMENT METHODS	<p>The evaluation takes place in thirtieths following an oral examination.</p> <p>The oral examination consists of an interview on the topics reported in the present card. The examination will be mainly aimed at verifying: the degree of knowledge acquired on the functioning of the organs; the ability to understand the integrated operation of the organs; presentation clarity; the ability to deepen the topics e acquisition of the technical language of the discipline.</p> <p>The evaluation of the oral exam will take place according to the criteria of described below.</p> <p>The threshold of sufficiency will be reached when the student shows knowledge and understanding of the topics at least in general lines and have sufficient applicative skills for solving simple concrete cases.</p>
TEACHING METHODS	Frontal lessons integrated with practical exercitations

MODULE MODULE I

Prof. GIUSEPPE FERRARO - Sede IPPOCRATE, - Sede IPPOCRATE

SUGGESTED BIBLIOGRAPHY

Grassi - Negrini - Porro Fisiologia umana - Poletto Editore
Conti et. al. Fisiologia medica Edi - Ermes
German e Stanfield, Fisiologia umana, Edises

AMBIT	50422-Funzioni biologiche integrate di organi, sistemi e apparati umani
INDIVIDUAL STUDY (Hrs)	90
COURSE ACTIVITY (Hrs)	60

EDUCATIONAL OBJECTIVES OF THE MODULE

At the end of the course, the student knows the functions of individual cells, excitability mechanisms and communication modalities between cells, the processes underlying cardiovascular, respiratory and kidney functions. Finally, each student is able to evaluate the functional basis of the pathophysiological processes.

SYLLABUS

Hrs	Frontal teaching
12	Neurophysiology electrical phenomena in excitable cells: resting potential of the membrane potential and the evolution to action potential or graduate phenomena. Conduction of action potential between cells: the electrical and chemical synaptic transmission, excitatory and inhibitory synapses, synaptic integration, spatial and temporal summation, pre-synaptic facilitation and inhibition. Neurotransmitters and their mechanism of action. The membrane receptors. The sensory receptors: classification, transduction process, receptive fields, encoding of information. Reflex activities: the structural basis of the reflexes, classification, properties. Autonomic nervous system: anatomical and functional organization, the parasympathetic and sympathetic nervous system.
10	Muscle physiology Structural and molecular basis of contraction of skeletal muscle, neuromuscular transmission, excitation-contraction coupling, mechanics of muscle contraction, motor unit, recruitment and graduation of the contractile force. Smooth muscle: unitary and multi-unitary smooth muscles, stimulus transmission from the nerve to the smooth muscle; contractile mechanism, mechanical properties.
18	Physiology of blood and cardiovascular system Blood and hemostasis; Hematopoiesis. Cardiac function: heart's electrical activity, mechanical properties and cardiac cycle, cardiac output and its regulation. EKG. Blood circulation: pressure, flow and resistance, blood pressure and its regulation, capillary exchanges and venous return, district circles.
10	Physiology of the kidney Glomerular filtration, clearance, renal plasma flow, tubular reabsorption and secretion, concentration mechanisms, antidiuretic hormone, renal regulation of acid-base equilibrium.
10	Respiration Respiratory mechanics. Lung volumes. alveolar- tissue respiratory gas exchange. Transport of oxygen and carbon dioxide in the blood. Nervous control of breathing. Respiratory response to the ' oxygen, carbon dioxide and hydrogen ions. Respiratory regulation of acid-base equilibrium.

MODULE MODULE II

Prof. GIUSEPPE FERRARO - Sede IPPOCRATE, - Sede IPPOCRATE

SUGGESTED BIBLIOGRAPHY

Fisiologia Medica. F. Conti – Edi-Ermes
Fisiologia umana. F. Grassi, D. Negrini e A. Porro. Poletto Ed.
Fisiologia C.L. Stanfield F. German EdiSes

AMBIT	50422-Funzioni biologiche integrate di organi, sistemi e apparati umani
INDIVIDUAL STUDY (Hrs)	90
COURSE ACTIVITY (Hrs)	60

EDUCATIONAL OBJECTIVES OF THE MODULE

Knowing the characteristics of communication between neurons , the high specialization of synapses and their role in processes of synaptic plasticity and neuronal basis of learning and memory. Knowing the bottom-up flows of information coming from the sensory organs and top down from the cerebral cortex. Knowing the functional organization of the various regions of the central nervous system that organize the motor activities and analyze the various sensory perceptions, with particular attention to brain higher cognitive functions of the cerebral cortex , such as language, the emotional and behavioral responses , the mechanisms of attention , mood and motivation. Wake and sleep rhythm.

SYLLABUS

Hrs	Frontal teaching
2	Functional organization of the central nervous system , with particular attention to the cerebral cortex . Organization of the peripheral and autonomic nervous system.
3	Neuronal electrical events : genesis and propagation of action potential;
5	Synaptic transmission and its modulation of synaptic integration mechanisms, release of neurotransmitters and neuropeptides and their interaction with the different classes of receptors. The synapse as the site of transmission of the action potential and intracellular signals that regulate the cell activity and gene expression . Synaptic plasticity and neurotrophic factors involved. Functions of glia.
4	Functional organization of vision and hearing with description of stimulus transduction into electrical event with encoding capacity of sensory information. Reflexes pupillary and accommodation .
5	Physiology of somatic (tactile , thermal , pain , proprioceptive) and visceral sensitivity. Physiology of taste and smell.
4	Organization of the motor system on voluntary movement.
3	Functional characteristics of cerebellar circuits involved in the control of the motor activity; .
2	Functional characteristics of basal ganglia circuits involved in the control of the motor activity. Cognitive and emotional role of the basal ganglia.
1	Mechanisms of spinal motor coordination : reflex action , the role of interneurons ;
4	Muscle tone and its regulation. Posture: brainstem mechanisms ; postural reflexes ; vestibular apparatus, tonic labyrinthine and neck reflexes. Locomotion. Ocular motility.
9	Functional organization of the cerebral cortex : role of the primary areas , associative uni- and multimodal of the occipital , temporal , parietal and frontal lobes. Functional symmetries and asymmetries of the two cerebral hemispheres . Top down and bottom up mechanisms to the base of the attention and consciousness.
2	Electroencephalography and its application. Anatomico-functional bases of sleep.
5	Anatomical and functional aspects of the limbic system : types of emotions, involved circuits and visceral- motor and behavioral reactions.
2	Anatomical and functional aspects of spread neurochemical systems: cholinergic, noradrenergic, dopaminergic, serotonergic and histaminergic and their impact in the cortical, emotional and behavioral activities '
2	Physiology of language
2	Formation of implicit, explicit and working memory and the brain areas involved
3	Homeostatic functions of the hypothalamus. Sexuality ' as a complex system of neuro-psycho-endocrinologic type.
2	Stem cells in the adult brain and functional aspects. Interaction between nervous and immune system.

MODULE MODULE I

Prof. GIUSEPPE GIGLIA - Sede HYPATIA, - Sede HYPATIA

SUGGESTED BIBLIOGRAPHY

FISIOLOGIA MEDICA. A cura di F. Conti – III ed. Edi-Ermes
 FISIOLOGIA UMANA. F. Grassi, D. Negrini e A. Porro. Poletto Ed.
 FISIOLOGIA UMANA. Di Schmidt, Lang, Thews. Idelson-Gnocchi
 FISIOLOGIA DI BERNE E LEVY. VII ed. B. A. Koeppen, B. A. Stanton, R. M. Berne, M. N. Levy - Zanichelli edizioni

AMBIT	50422-Funzioni biologiche integrate di organi, sistemi e apparati umani
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INDIVIDUAL STUDY (Hrs)	90
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COURSE ACTIVITY (Hrs)	60
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EDUCATIONAL OBJECTIVES OF THE MODULE

Knowledge of central, peripheral and vegetative nervous system

SYLLABUS

Hrs	Frontal teaching
1	Functional organization of the central, peripheral and autonomic nervous system.
4	Autonomic Nervous System: ortho- and parasympathetic branches
1	Functions of glia.
8	Neurons interaction: synaptic transmission and its modulation, synaptic integration mechanisms, Neurotransmitters release and interaction with receptors. Gaseous nervous signals. Neuropeptides
2	Synaptic plasticity, neurotrophic factors, neuronal senescence and cell death
2	Neural aging, cell death. Wallerian Degeneration
5	Visceral and Somatic Senses (touch, thermal, pain, position)
5	Organization of Motor System
6	Spinal mechanisms of motor coordination: reflexes, role of interneurons
4	Muscle tone and its regulation.
4	Posture: brainstem mechanisms ; postural reflexes ; vestibular apparatus, tonic labyrinthine and neck reflexes. Locomotion. Ocular motility.
2	Functional organization of voluntary movement: relationship between anatomy (cortical areas, cortico-spinal pathway) and motor functions
2	Functional characteristics of motor networks
2	Functional characteristics of the cerebellar circuits involved in motor control
3	Functional characteristics of basal ganglia circuits involved in motor control
1	Ocular movements
3	Anatomo-functional organization of cerebral cortex. Common electrophysiological findings in Electroencephalogram in healthy and diseased brain.
2	Anatomo-functional aspects of limbic system
3	Anatomo-functional basis of higher cortical functions: sleep, language, memory

MODULE MODULE II

Prof. GIUSEPPE GIGLIA - Sede HYPATIA, - Sede HYPATIA

SUGGESTED BIBLIOGRAPHY

Fisiologia Umana a cura di F. Grassi e altri. Poletto Editore
Fisiologia Medica a cura di F. Conti. Edi-Ermes
Fisiologia di Berne & Levy. Casa Editrice Ambrosiana
Fisiologia di R. Klinke, H.C. Pape, A. Kurtz. Edises

AMBIT	50422-Funzioni biologiche integrate di organi, sistemi e apparati umani
INDIVIDUAL STUDY (Hrs)	90
COURSE ACTIVITY (Hrs)	60

EDUCATIONAL OBJECTIVES OF THE MODULE

Understand the physical and chemical mechanisms and the molecular basis of fundamental cellular physiological processes such as: the membrane electrical polarization, the genesis of the action potential (excitability), the communication between cells via synapses, muscle contraction, transduction of stimuli physiological into electrical signals by receptor cells of the sensory systems and the study of reflex activity. Know the functions of blood and body fluids. Describe the physical basis of the cardiovascular and respiratory systems and kidney. Explain the physiological processes in terms of the appropriate physical and chemical laws and understand the method of application of such laws. Understand the nervous and humoral regulatory mechanisms and their coordination in the execution of specific tasks such as: the homeostasis of osmolarity and extracellular fluid volume, the regulation of blood pressure and cardiac output. Explain muscle, cardio-circulatory and respiratory adjustments during exercise.

SYLLABUS

Hrs	Frontal teaching
2	Describe the body fluids and their composition
2	Describe the general characteristics of omeostatic control systems
2	Sketch of the water transport mechanisms and of the solutes through biological membranes
2	Describe the genesis excitability phone
2	Illustrate the mode of interaction between excitable cells. Explaining the modalities of the receptor cells function and the transduction mechanisms of various forms of energy.
2	Generality on the activity reflected
5	Describe the functional characteristics of the striatum muscle and the smooth muscle.
2	Explain heart excitability phenomena and automatism
3	Explain the phases of the cardiac cycle correlating them with cardiac mechanics defining the stroke volume and cardiac output
4	Explain the mechanisms that regulate cardiac activity and blood pressure
1	Blood pressure measurement
3	Explain in terms electrophysiological mode of production and significance of normal waves in the ECG and the concept of cardiac electrical axis.
3	Describe the morphological and functional characteristics of blood components: red blood cells, white blood cells, platelets, plasma proteins.
1	Explain the process of hemostasis and fibrinolysis
2	Explain the functions (in relation to the structure) of the different sections of the tree vessel: arterial system, capillary, venous system, the capillaries circles and their organ peculiarities
1	Describe briefly the morphological and functional aspects of microcirculation
1	Provide basic information on the relationships between structure and function of the lymphatic system
2	Describe the basic concepts of physics of gases useful for the understanding of respiratory function
2	Correlate respiratory activity with morphology and functionality of the structures that will oversee.
1	Explain the physical basis of the alveolus lung expansion mechanism.
2	Correlate respiratory mechanics concepts and work of breathing
2	Describe the spirometric investigation and correlate the results with the breathing functionality. Flow-volume curves
3	illustrate the principles and the physiological mechanisms that regulate alveolar-capillary gas exchange and transport of respiratory gases in the blood
2	Explain the chemical ,nervous and other nature mechanisms that regulate the respiratory activity
2	Explaining the modalities of plasma pH adjustment on the part of the respiratory function and recognize the changes in pH due to this.

3	Describe functional bases of urine formation: glomerular filtration, tubular reabsorption and secretion, excretion
3	Describe renal actions on water-electrolytic balance, blood volume and blood pressure, levels of metabolites and acid-base balance

MODULE MODULE II

Prof. PIERANGELO SARDO - Sede CHIRONE, - Sede CHIRONE

SUGGESTED BIBLIOGRAPHY

Fisiologia Umana a cura di F. Grassi e altri. Poletto Editore 2015
 Fisiologia. Di R.M. Berne, M.N. Levy, B.M. Koeppen, B.A. Stanton. Casa Editrice Ambrosiana
 Fisiologia Medica. A cura di F. Conti – Edi-Ermes
 Fisiologia Medica. W.F. Boron, E.L. Boulpaep - EDRA

AMBIT	50422-Funzioni biologiche integrate di organi, sistemi e apparati umani
INDIVIDUAL STUDY (Hrs)	90
COURSE ACTIVITY (Hrs)	60

EDUCATIONAL OBJECTIVES OF THE MODULE

To know the functions of the central, peripheral and vegetative nervous system.

SYLLABUS

Hrs	Frontal teaching
1	Indicate in general terms the morpho-functional organization of the central nervous system, peripheral and vegetative
4	Describe the activities' of the autonomic nervous system: ortho-sympathetic and parasympathetic component
1	Indicate the functions of glia
8	Describe the elementary interactions between neurons: synaptic transmission and its modulation, mechanisms of synaptic integration, release of neurotransmitters and their interaction with different classes of receptors. Manipulation of synaptic transmission. Gas transmission of nerve signals. The neuropeptides.
2	Define the concept of synaptic plasticity, indicate main neurotrophic factors and synthesize neuro-physiological processes of aging and cell death
2	Explain neuro-physiological aging and cell death. Wallerian degeneration
5	Explain the physiological mechanisms of somatic sensitivity (tactile, thermal, to pain, proprioceptive) and visceral
5	Indicate in its major components the organization of the motor system
6	Illustrate the mechanisms of spinal motor coordination: reflex action, the role of interneurons
4	Muscle tone and its regulation
4	Posture: brainstem mechanisms; postural reflexes; vestibular apparatus and tonic labyrinthine and cervical reflexes. Locomotion
2	Illustrate from the structural and functional point of view the organization of voluntary movement: the relationship between anatomical structures (cortical areas, the cortico-spinal pathway) and motor functions
2	Describe in general the functional characteristics of the motor control systems
2	Describe the functional characteristics of the cerebellar circuits involved in the control of the motor activity
3	Describe the functional characteristics of the basal ganglia circuits involved in the control of the motor activity
1	Ocular motility
3	Describe the anatomical and functional organization of the cerebral cortex. Correlate the electrophysiological principles with the most common physiological and pathological results of electroencephalography
2	Describe the anatomical and functional aspects of the limbic system
3	Explain the anatomical and functional basis of higher nervous functions: sleep, language, memory

MODULE MODULE I

Prof. PIERANGELO SARDO - Sede CHIRONE, - Sede CHIRONE

SUGGESTED BIBLIOGRAPHY

Grassi - Negrini - Porro Fisiologia umana - Poletto Editore
Conti et. al. Fisiologia medica Edi - Ermes
German e Stanfield, Fisiologia umana, Edises

AMBIT	50422-Funzioni biologiche integrate di organi, sistemi e apparati umani
INDIVIDUAL STUDY (Hrs)	90
COURSE ACTIVITY (Hrs)	60

EDUCATIONAL OBJECTIVES OF THE MODULE

At the end of the course, the student knows the functions of individual cells, excitability mechanisms and communication modalities between cells, the processes underlying cardiovascular, respiratory and kidney functions. Finally, each student is able to evaluate the functional basis of the pathophysiological processes.

SYLLABUS

Hrs	Frontal teaching
12	Neurophysiology electrical phenomena in excitable cells: resting potential of the membrane potential and the evolution to action potential or graduate phenomena. Conduction of action potential between cells: the electrical and chemical synaptic transmission, excitatory and inhibitory synapses, synaptic integration, spatial and temporal summation, pre-synaptic facilitation and inhibition. Neurotransmitters and their mechanism of action. The membrane receptors. The sensory receptors: classification, transduction process, receptive fields, encoding of information. Reflex activities: the structural basis of the reflexes, classification, properties. Autonomic nervous system: anatomical and functional organization, the parasympathetic and sympathetic nervous system.
10	Muscle physiology Structural and molecular basis of contraction of skeletal muscle, neuromuscular transmission, excitation-contraction coupling, mechanics of muscle contraction, motor unit, recruitment and graduation of the contractile force. Smooth muscle: unitary and multi-unitary smooth muscles, stimulus transmission from the nerve to the smooth muscle; contractile mechanism, mechanical properties.
18	Physiology of blood and cardiovascular system Blood and hemostasis; Hematopoiesis. Cardiac function: heart's electrical activity, mechanical properties and cardiac cycle, cardiac output and its regulation. EKG. Blood circulation: pressure, flow and resistance, blood pressure and its regulation, capillary exchanges and venous return, district circles.
10	Physiology of the kidney Glomerular filtration, clearance, renal plasma flow, tubular reabsorption and secretion, concentration mechanisms, antidiuretic hormone, renal regulation of acid-base equilibrium.
10	Respiration Respiratory mechanics. Lung volumes. alveolar- tissue respiratory gas exchange. Transport of oxygen and carbon dioxide in the blood. Nervous control of breathing. Respiratory response to the oxygen, carbon dioxide and hydrogen ions. Respiratory regulation of acid-base equilibrium.

MODULE MODULE III

Prof.ssa DANILA DI MAJO - Sede IPPOCRATE, - Sede IPPOCRATE

SUGGESTED BIBLIOGRAPHY

FISIOLOGIA MEDICA. A cura di F. Conti – III ed. Edi-Ermes ISBN: 9788870515459 - Volume 1

9788870515466 - Volume 2

FISIOLOGIA UMANA. F. Grassi, D. Negrini e A. Porro. Poletto Ed. ISBN: 8895033590

FISIOLOGIA UMANA. Schmidt, Lang, Thews. Idelson-Gnocchi. ISBN: 9788879474696

FISIOLOGIA DI BERNE E LEVY. VII ed. B. A. Koeppen, B. A. Stanton, R. M. Berne, M. N. Levy - Zanichelli edizioni. ISBN: 9788808480040.

AMBIT	50422-Funzioni biologiche integrate di organi, sistemi e apparati umani
INDIVIDUAL STUDY (Hrs)	75
COURSE ACTIVITY (Hrs)	50

EDUCATIONAL OBJECTIVES OF THE MODULE

The course aims at building structured knowledge about gastrointestinal digestion and absorption processes, as well as on hormones and their integrated actions.

SYLLABUS

Hrs	Frontal teaching
1	Presentation of the organization of the course. Illustration of the anatomical-functional features of the digestive system.
3	Bioenergetics, basal and activity metabolism rate. The qualitative and quantitative nutritional needs of the organism in various physiological conditions.
3	The caloric food ingredients: carbohydrates, proteins, lipids. The non-caloric food ingredients: vitamins, minerals, water.
8	To illustrate the functions of the alimentary canal: motility, secretion, digestion, absorption and to explain the physiological mechanisms of their fulfillment.
3	To indicate the mechanisms of intestinal function regulation operated by the CNS, the enteric nervous system and gastrointestinal hormones
2	The role of the liver in nutrition and intermediate metabolism.
2	Mechanisms of neuro-hormonal control of fluid and food intake
2	Mechanisms of thermoregulation
2	Hormones action mechanisms in the transmission of specific functional messages
5	The functions of the hypothalamic hormones and adeno-pituitary hormones. The feedback mechanisms controlled by the hypothalamus-pituitary gland. general and specific feedback mechanisms in the regulation of hormonal incretion. Brief overview on thymus and epiphysis
3	Hormonal control of glycemia
2	Integrated mechanisms of serum calcium control, the role of parathyroid hormone, vitamin D3 and calcitonin
2	Mechanisms of hormonal control on general body growth. Role of the Growth hormon
2	To indicate the specific effects of the individual hormones on the functions of the different organs and systems that represent the target: pre and post-pituitary hormones
2	Thyroid and Parathyroid hormones.
4	Hormones of the adrenal cortex and medulla
4	Male and female gonadal hormones. Pregnancy and childbirth

MODULE MODULE III

Prof.ssa GIUDITTA GAMBINO - Sede HYPATIA, - Sede HYPATIA

SUGGESTED BIBLIOGRAPHY

FISIOLOGIA MEDICA. A cura di F. Conti – III ed. Edi-Ermes
 FISIOLOGIA UMANA. F. Grassi, D. Negrini e A. Porro. Poletto Ed.
 FISIOLOGIA UMANA. Di Schmidt, Lang, Thews. Idelson-Gnocchi
 FISIOLOGIA DI BERNE E LEVY. VII ed. B. A. Koeppen, B. A. Stanton, R. M. Berne, M. N. Levy - Zanichelli edizioni

AMBIT	50422-Funzioni biologiche integrate di organi, sistemi e apparati umani
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INDIVIDUAL STUDY (Hrs)	75
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COURSE ACTIVITY (Hrs)	50
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EDUCATIONAL OBJECTIVES OF THE MODULE

To understand the digestion-absorption processes that identify the functional role of the digestive system. To understand the hormones and their integrated actions.

SYLLABUS

Hrs	Frontal teaching
1	Presentation of the organization of the course. Illustration of the anatomical-functional features of the digestive system.
3	Bioenergetics, basal and activity metabolism rate. The qualitative and quantitative nutritional needs of the organism in various physiological conditions.
3	The caloric food ingredients: carbohydrates, proteins, lipids. The non-caloric food ingredients: vitamins, minerals, water.
8	Explain the functions of the alimentary canal: motility, secretion, digestion, absorption and the physiological mechanisms of their fulfillment
3	State the mechanisms of regulation of intestinal functions operated by the CNS, enteric nervous system and gastrointestinal hormones
2	The role of the liver in nutrition and intermediate metabolism.
2	Mechanisms of neuro-hormonal control of fluid and food intake.
2	Mechanisms of thermoregulation.
2	Hormones action mechanisms in the transmission of specific functional messages.
5	The functions of the hypothalamic hormones and adeno-pituitary hormones. The feedback mechanisms controlled by the hypothalamus-pituitary gland. general and specific feedback mechanisms in the regulation of hormonal incretion.
3	Hormonal control of glycemia.
2	Integrated mechanisms of serum calcium control, the role of parathyroid hormone, vitamin D3 and calcitonin.
2	Mechanisms of hormonal control on general body growth. Role of the Growth hormon.
2	State the specific effects of individual hormones on the functions of different organs and apparatuses that target them: pre- and post-hypophyseal hormones
2	thyroid and parathyroid hormones
4	Cortical and adrenal medullary hormones
4	Male and female gonadal hormones. Pregnancy and childbirth

MODULE MODULE III

Prof.ssa GIUSEPPA MUDO' - Sede CHIRONE, - Sede CHIRONE

SUGGESTED BIBLIOGRAPHY

FISIOLOGIA MEDICA. A cura di F. Conti – III ed. Edi-Ermes ISBN: 9788870515459 - Volume 1
9788870515466 - Volume 2

FISIOLOGIA UMANA. F. Grassi, D. Negrini e A. Porro. Poletto Ed. ISBN: 8895033590

FISIOLOGIA UMANA. Schmidt, Lang, Thews. Idelson-Gnocchi. ISBN: 9788879474696

FISIOLOGIA DI BERNE E LEVY. VII ed. B. A. Koeppen, B. A. Stanton, R. M. Berne, M. N. Levy - Zanichelli edizioni. ISBN: 9788808480040.

AMBIT	50422-Funzioni biologiche integrate di organi, sistemi e apparati umani
INDIVIDUAL STUDY (Hrs)	75
COURSE ACTIVITY (Hrs)	50

EDUCATIONAL OBJECTIVES OF THE MODULE

Put the student to be able to understand the processes that identify the functional role of gastro-intestinal and endocrine apparatus.

Knowing the digestion-absorption processes that identify the functional role of the digestive system.

Learn about the hormones and their integrated actions

SYLLABUS

Hrs	Frontal teaching
1	Presentation of the course organization. Illustration of the anatomical - functional features of digestive relations.
3	Bioenergetics, basal and activity metabolism rate. The qualitative and quantitative nutritional needs of the organism in various physiological conditions.
3	The caloric food ingredients: carbohydrates, proteins, lipids. The non-caloric food ingredients: vitamins, minerals, water.
8	To illustrate the functions of the alimentary canal: motility, secretion, digestion, absorption and to explain the physiological mechanisms of their fulfillment
3	To indicate the mechanisms of intestinal function regulation operated by the CNS, the enteric nervous system and gastrointestinal hormones
2	Liver role in nutrition and intermediary metabolism.
2	Mechanisms of neuro-hormonal control of fluid and food intake
2	Mechanisms of thermoregulation
2	Mechanisms of action of hormones in the transmission of specific messages
5	The functions of the hypothalamic hormones and adeno-pituitary hormones. The feedback mechanisms controlled by the hypothalamus-pituitary gland. general and specific feedback mechanisms in the regulation of hormonal incretion. Brief overview on thymus and epiphysis endocrine function
3	Hormonal control of glycemia.
2	Integrated mechanisms of serum calcium control, the role of parathyroid hormone, vitamin D3 and calcitonin
2	Mechanisms of hormonal control on general body growth. Role of the Growth hormon.
2	To indicate the specific effects of the individual hormones on the functions of the different organs and systems that represent the target: pre and post-pituitary hormones
2	Thyroid and parathyroid hormones
4	Hormones of the cortical and adrenal medulla
4	Male and female gonadal hormones. Pregnancy and childbirth