



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Biomedicina, Neuroscienze e Diagnostica avanzata		
ACADEMIC YEAR	2019/2020		
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)	CRESCIMANNO GIUSEPPE	Professore Ordinario	Univ. di PALERMO
	BELLUARDO NATALE	Professore Ordinario	Univ. di PALERMO
	MORICI GIUSEPPE	Professore Associato	Univ. di PALERMO
OTHER PROFESSOR(S)	GIGLIA GIUSEPPE	Professore Associato	Univ. di PALERMO
	MUDO' GIUSEPPA	Professore Ordinario	Univ. di PALERMO
	CRESCIMANNO GIUSEPPE	Professore Ordinario	Univ. di PALERMO
	MORICI GIUSEPPE	Professore Associato	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)	2° semester		
ATTENDANCE	Mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	<p>BELLUARDO NATALE</p> <p>Monday 15:00 18:00 Dipartimento BIONEC sezione FisiologiaCorso Tukory 129</p> <p>Tuesday 15:00 18:00 Dipartimento BIONEC sezione FisiologiaCorso Tukory 129</p> <p>Wednesday 15:00 18:00 Dipartimento BIONEC sezione FisiologiaCorso Tukory 129</p> <p>Thursday 15:00 18:00 Dipartimento BIONEC sezione Fisiologia Corso Tukory 129</p> <p>CRESCIMANNO GIUSEPPE</p> <p>Monday 08:30 11:30 Per appuntamento in Fisiologia Umana, Corso Tukory 129</p> <p>Wednesday 08:30 11:30 Per appuntamento in Fisiologia Umana, Corso Tukory 129</p> <p>FERRARO GIUSEPPE</p> <p>Tuesday 11:00 13:00 Sezione di Fisiologia umana del Dipartimento BIONECC.so Tukory, 129Palermo</p> <p>Thursday 11:00 13:00 Sezione di Fisiologia umana del Dipartimento BIONECC.so Tukory, 129Palermo</p> <p>GIGLIA GIUSEPPE</p> <p>Tuesday 16:40 18:40 Campus Universitario - Padiglione 11 CEPAS, via G. Mule,1 Caltanissetta</p> <p>Thursday 16:40 18:40 Campus Universitario - Padiglione 11 CEPAS, via G. Mule,1 Caltanissetta</p>		

	MORICI GIUSEPPE			
	Thursday	11:00	13:00	Per l'appuntamento chiamare al 3392514805 - Dipartimento di Biomedicina Sperimentale e Neuroscienze Cliniche (Fisiologia Umana) Università di Palermo Corso Tukory 129, Palermo
	MUDO' GIUSEPPA			
	Monday	00:00	00:01	Previo accordo
	SARDO PIERANGELO			
	Monday	09:30	10:30	BiND- Sezione di Fisiologia umana - Corso Tukory, 129 - II piano
	Friday	09:30	10:30	BiND- Sezione di Fisiologia umana - Corso Tukory, 129 - II piano

DOCENTE: Prof. GIUSEPPE CRESCIMANNO- Sede *CHIRONE*

PREREQUISITES	Knowledges of Chemistry, Physics, Biology, Biochemistry, Anatomy
LEARNING OUTCOMES	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.
ASSESSMENT METHODS	The evaluation takes place in thirtieths following an oral examination. 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. The evaluation of the oral exam will take place according to the criteria of described below. 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.
TEACHING METHODS	Frontal lessons integrated with practical exercitations

MODULE MODULE II

Prof. GIUSEPPE CRESCIMANNO - 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	
Knowing the functions of the central nervous system, peripheral and vegetative	

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 of synaptic integration mechanisms, release of neurotransmitters and their interaction with the 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 neck 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) 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. GIUSEPPE FERRARO - Sede CHIRONE, - Sede CHIRONE

SUGGESTED BIBLIOGRAPHY

Silverthorn: "Fisiologia Umana - Un approccio integrato" - Casa editrice: Pearson
 Scotto - Mondola: Fisiologia. Poletto editore
 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.

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 III

Prof. PIERANGELO SARDO - Sede IPPOCRATE, - Sede IPPOCRATE

SUGGESTED BIBLIOGRAPHY

Fisiologia umana. A cura di F. Grassi, Daniela Negrini e A. Porro. Poletto Editore

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)	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
9	Functions of the alimentary canal: motility, secretion, digestion, absorption.
4	Control of gastrointestinal functions exerted by Central and Enteric nervous systems and by gastrointestinal hormones.
3	Motility of colon-rectum. Evacuation reflex.
4	Nervous and endocrine control of fluid and dietary intake.
4	Role and functions of the liver in nutrition and metabolism. Mechanisms of thermoregulation.
3	Mechanisms of hormonal actions as specific messengers. Endocrine actions of thymus gland and pineal body.
3	Hormones released by hypothalamus and anterior hypophysis. Feedback control of hormonal secretion.
3	Hormonal control of blood glucose.
2	Control of blood calcium; role of parathyroids
2	Hormonal control of somatic growth.
2	Specific hormonal effects on target organs and apparatuses. pre- and post-hypophyseal hormones.
3	Thyroid and Parathyroid hormones.
4	Hormones released by cortex and medulla of the Adrenal gland.
4	Sex hormones.

MODULE MODULE III

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

SUGGESTED BIBLIOGRAPHY

FISIOLOGIA MEDICA. A cura di F. Conti – 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. Sesta edizione. B. A. Koeppen, B. A. Stanton, R. M. Berne, M. N. Levy - CEA edizioni

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 and functional digestive relations.
5	Bioenergetics, physical activity and resting metabolic rate. The qualitative nutritional needs and body quantities in various physiological conditions.
6	The caloric food ingredients: carbohydrates, proteins, lipids. The non-caloric food ingredients: vitamins, minerals, water.
8	Motor, secretory, digestion and absorption functions of the digestive system. Regulatory mechanisms: the CNS, the enteric brain and gastrointestinal hormones.
2	Liver role in nutrition and intermediary metabolism.
2	Mechanisms of neuro-hormonal control of fluid and food intake
2	The homeostatic functions of the hypothalamus
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 increscion. Brief overview on thymus and epiphysis endocrine function
3	Hormonal control of blood glucose
3	Integrated mechanisms of serum calcium control, the role of parathyroid hormone, vitamin D3 and calcitonin
3	Mechanisms of hormonal control on general body growth. Role of the Growth hormon.
6	Specific effects of individual hormones on the functions of different organs and systems that represent the target: pre and post-pituitary hormones, thyroid hormones, hormones of the adrenal cortex and medulla, male and female gonadal hormones