



Information about the subject

Degree: Bachelor of Science Degree in Medicine

Faculty: Faculty of Medicine and Health Sciences

Code: 341204 **Name:** Human Physiology I

Credits: 6,00 **ECTS Year:** 2 **Semester:** 1

Module: Morphology, structure and function of the human body

Subject Matter: Physiology **Type:** Basic Formation

Field of knowledge: Health Science

Department: Anatomy and Physiology

Type of learning: Classroom-based learning

Languages in which it is taught: Spanish

Lecturer/-s:

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Module organization

Morphology, structure and function of the human body

Subject Matter	ECTS	Subject	ECTS	Year/semester
Morphology and microscopic structure of the human body	6,00	Histology	6,00	2/1
Biology	6,00	Cell Biology	6,00	1/1
Anatomy	27,00	Anatomy II	9,00	2/1
		Anatomy III	6,00	2/2
		Embryology and Anatomy I	12,00	1/2
Biochemistry	9,00	Biochemistry and Molecular Biology	9,00	1/2
Physics	6,00	Biophysics	6,00	1/2
Physiology	12,00	Human Physiology I	6,00	2/1
		Human Physiology II	6,00	2/2



Learning outcomes

At the end of the course, the student must be able to prove that he/she has acquired the following learning outcomes:

- R1 Know the basic principles of physiology
- R2 Know the functioning of the different devices and systems, having the basis to be able to interpret the pathological clinical situations later
- R3 Being able to relate the basic functioning of the different systems and devices, highlighting the common or particular aspects between them
- R4 Know the normal range of the most common analytical data and correctly interpret normal physiological records
- R5 Actively understand and participate in clinical and/or laboratory practices
- R6 Show problem-solving ability based on clinical cases based on the physiology that is presented to you
- R7 Being able to write an understandable and organized text on various aspects of human physiology
- R8 Being able to produce documents on physiology by working as a team
- R9 Arguing with rational criteria from your work
- R10 Show problem-solving capability based on clinical cases.
- R11 Be able to gain clinical experience under proper supervision.



Competencies

Depending on the learning outcomes, the competencies to which the subject contributes are (please score from 1 to 4, being 4 the highest score):

BASIC		Weighting			
		1	2	3	4
CB1	Students have demonstrated to possess and understand knowledge in a study area that starts from the base of the general secondary education, and is usually found at a level that, while supported by advanced textbooks, also includes some aspects that involve knowledge from the forefront of their field of study				X
CB2	Students know how to apply their knowledge to their job or vocation in a professional way and possess the competences that are usually demonstrated through the elaboration and defense of arguments and the resolution of problems within their area of study				X
CB3	Students have the ability to collect and interpret relevant data (usually within their area of study) to make judgments that include a reflection on relevant social, scientific or ethical topics				X
CB4	Students can pass on information, ideas, problems and solutions to both a specialized and non-specialized audience				X
CB5	Students have developed the learning skills needed to undertake further studies with a high degree of autonomy				X
GENERAL		Weighting			
		1	2	3	4
CG7	Understanding and recognizing the normal structure and function of the human body, at the molecular, cellular, tissue, organic and systems levels, at the different stages of life and in both sexes				X
CG11	Understanding and recognizing the effects of growth, development and aging on the individual and their social environment		X		
CG30	Basic knowledge of the National Health System and health legislation	X			



SPECIFIC		Weighting			
		1	2	3	4
CE3	Knowing the morphology, structure and function of the skin, blood, circulatory, digestive, locomotive, reproductive, excretor and respiratory systems; endocrine system, immune system and central and peripheral nervous system. Growth, maturation and aging of different devices and systems. Homeostasis. Adaptation to the environment				X
CE4	Handling basic laboratory materials and techniques. Interpreting a normal analysis			X	
CE6	Performing functional tests, determine vital parameters, and interpret them. Basic physical examination				X

TRANSVERSAL		Weighting			
		1	2	3	4
CT1	Analytical and synthesis capacity			X	
CT2	Planification and organization capacity		X		
CT3	Oral and written communication in mother language				X
CT6	Manage information capacity			X	
CT7	Solving problems		X		
CT9	Team work			X	
CT12	Interpersonal relationship skills		X		
CT14	Critical reasoning			X	
CT16	Individual learning				X
CT18	Creativity		X		
CT19	Leadership		X		



CT25 Autocriticism capacity

x

CT26 Knowing how to value personal action and know your own skills and limitations

x

Assessment system for the acquisition of competencies and grading system

Assessed learning outcomes	Granted percentage	Assessment method
R1, R2, R3, R4, R6, R8, R10	25,00%	Open questions
R1, R2, R3, R4, R6, R8, R10	60,00%	Tests
R4, R5, R6, R7, R8, R9, R11	10,00%	Work
R1, R2, R3, R4, R6, R9, R10	5,00%	Participation in class

Observations

Criteria for awarding honors:

Honors may be awarded to the best students, who must have obtained a minimum grade of at least 9, as a prerequisite to be eligible for it.

If circumstances require it, a special test may be established to determine those students deserving of honors, taking into account the 5% limitation of enrolled students.

In second and subsequent calls, only the honors that may subtract after the first call may be granted.



MENTION OF DISTINCTION:

In accordance with the regulations governing the assessment and grading of subjects in force at UCV, the distinction of "Matrícula de Honor" (Honours with Distinction) may be awarded to students who have achieved a grade of 9.0 or higher. The number of "Matrículas de Honor" (Honours with Distinction) may not exceed five percent of the students enrolled in the group for the corresponding academic year, unless the number of enrolled students is fewer than 20, in which case a single "Matrícula de Honor" (Honours with Distinction) may be awarded. Exceptionally, these distinctions may be assigned globally across different groups of the same subject. Nevertheless, the total number of distinctions awarded will be the same as if they were assigned by group, but they may be distributed among all students based on a common criterion, regardless of the group to which they belong. The criteria for awarding "Matrícula de Honor" (Honours with Distinction) will be determined according to the guidelines stipulated by the professor responsible for the course, as detailed in the "Observations" section of the evaluation system in the course guide.

Learning activities

The following methodologies will be used so that the students can achieve the learning outcomes of the subject:

M1	Masterclass
M4	Content presentations by teacher
M5	Knowledges and skills explanation
M6	Laboratory practices
M7	Oral presentation by student
M9	Knowledge acquirance through student interaction and activity
M11	Personalised attention by professor
M14	Online activity on e-learning
M15	Personal study
M17	Discussion and solving issues in group



M18 Work in team

IN-CLASS LEARNING ACTIVITIES

	LEARNING OUTCOMES	HOURS	ECTS
Theory class M1, M4, M5	R1, R2, R3, R4, R6, R9, R10, R11	44,50	1,78
Practices in small groups M6, M9, M11, M17, M18	R1, R2, R4, R5, R6, R7, R8, R9, R10	8,00	0,32
Tutoring M11	R1, R2, R3, R4, R6, R7, R8, R9, R10, R11	3,00	0,12
Evaluation M15, M18	R1, R2, R3, R4, R7, R8, R9, R10, R11	3,00	0,12
TOTAL		58,50	2,34

LEARNING ACTIVITIES OF AUTONOMOUS WORK

	LEARNING OUTCOMES	HOURS	ECTS
No attendance M9, M11, M14, M15, M17, M18	R1, R2, R3, R4, R5, R6, R7, R8, R9, R10, R11	91,50	3,66
TOTAL		91,50	3,66



Description of the contents

Description of the necessary contents to acquire the learning outcomes.

Theoretical contents:

Content block	Contents
Basic physiology	<ul style="list-style-type: none">·Introduction. Concept and history of physiology. Related sciences. Functional organization of the human body.·Internal environment. Body fluids. Functional composition of the body. Homeostasis. Feedback systems. Negative feedback. Positive feedback.·Transport mechanisms: Osmosis. Diffusion. Passive and active transportation. Regulation of the water compartments: Sodium potassium pump. Hydrostatic pressure. Oncotic pressure·Properties of the membrane at rest: electrical changes. <p>Stimuli</p> <ul style="list-style-type: none">·Action potential: generation and propagation·Synapse Physiology: Chemical and Electrical Synapses. Neurotransmitters. Neurons and cholinergic receptors. Neurons and adrenergic receptors. Postsynaptic potentials·Physiology of muscle arousal and contraction. Properties of muscle tissue. Functions of muscle tissue. Theory of the sliding filament. The neuromuscular junction. Muscular tone. Voluntary contraction and reflexes. Regulation of contraction. Excitation and contraction of the striated muscle. Smooth muscle excitation and contraction.
Blood physiology	<ul style="list-style-type: none">·Composition. Plasma: components and functions. Formation of blood cells·Erythrocytes. Life cycle Iron metabolism. Oxygen transport. Blood groups·Physiology of hemostasis. Platelets Coagulation cascade



Cardiovascular physiology

- The cardiac muscle: excitation and contraction. Concepts of cardiac electrophysiology. Driving system
- The cardiac cycle. Systole and diastole. Driving system. Valve function
- Cardiac output. Tissue oxygen supply (DO_2). Capillary tissue oxygen exchange (IE). Tissue oxygen consumption (VO_2). Venous return.
- Coronary perfusion. Functional view of the coronary tree. Regulation.
- Self-regulation. Self-regulation of cardiac output. Self-regulation of tissue perfusion. Self-regulation of blood pressure (perfusion pressure)
- Special circulations

Respiratory physiology

- Introduction to respiration: Cellular and pulmonary respiration. Components of respiratory function. Ventilation, perfusion and gas exchange
- Ventilation and perfusion. Ventilation. Pulmonary mechanical characteristics. Perfusion. Ventilation / perfusion ratio. Dead space. Shunt.
- Alveolar exchange, transport and tissue exchange of oxygen.
- The control of respiration: Receptors. The respiratory center
- Non-respiratory functions of the lungs

PHYSIOLOGY OF THE RENAL SYSTEM

Introduction to renal physiology. Body fluids and functional structure of the nephron. Renal circulation. Renal hemodynamics. Glomerular filtration. Renal blood flow. Kidney clearance. Tubular functions. Mechanisms of tubular reabsorption and secretion. Mechanisms of concentration and dilution of urine. Regulation of osmolality. Renal regulation of extracellular volume. Regulation of acid-base balance. Urination

Practical lessons

Session 1: Action potential
Session 2: Electromyography
Session 3: Electrocardiogram
Session 4: Renal physiology



Temporary organization of learning:

Block of content	Number of sessions	Hours
Basic physiology	6,00	12,00
Blood physiology	4,00	8,00
Cardiovascular physiology	6,00	12,00
Respiratory physiology	5,25	10,50
PHYSIOLOGY OF THE RENAL SYSTEM	4,00	8,00
Practical lessons	4,00	8,00

References

- Hall, J.E. (2021) Guyton & Hall Textbook of Medical Physiology. 14th edition. Elsevier.
- Boron, W.F., Boulpaep, E.L. (2012) Medical Physiology. Ed. Elsevier Saunders.
- Koeppen, B.M. (2009) Berne and Levy: Physiology. 6th edition. Elsevier .
- Kandel, E.R. (2013) Principles of Neural Sciences. Mc Graw Hill
- Tortora, G.J., Derrickson, D. (2013). Principles of Anatomy and Physiology. 13th edition. Panamericana.
- Ira Fox, S. (2014). Human Physiology. 13th. Mc Graw Hill.
- Silverthorn, D.U. (2014). Human Physiology: An Integrated Approach . 6th. Panamericana.
- Fernandez-Tresguerres, J.A. (2011) Human Physiology. 4th edition. McGrawHill.
- Thibodeau, G.A., Patton, K.T. (2007). Anatomy and Physiology. 6th edition. Elsevier Mosby.
- Barrett, K.E. (2011) Ganong Medical physiology. 23rd edition. MacGraw Hill.



Addendum to the Course Guide of the Subject

Due to the exceptional situation caused by the health crisis of the COVID-19 and taking into account the security measures related to the development of the educational activity in the Higher Education Institution teaching area, the following changes have been made in the guide of the subject to ensure that Students achieve their learning outcomes of the Subject.

Situation 1: Teaching without limited capacity (when the number of enrolled students is lower than the allowed capacity in classroom, according to the security measures taken).

In this case, no changes are made in the guide of the subject.

Situation 2: Teaching with limited capacity (when the number of enrolled students is higher than the allowed capacity in classroom, according to the security measures taken).

In this case, the following changes are made:

1. Educational Activities of Onsite Work:

All the foreseen activities to be developed in the classroom as indicated in this field of the guide of the subject will be made through a simultaneous teaching method combining onsite teaching in the classroom and synchronous online teaching. Students will be able to attend classes onsite or to attend them online through the telematic tools provided by the university (videoconferences). In any case, students who attend classes onsite and who attend them by videoconference will rotate periodically.

In the particular case of this subject, these videoconferences will be made through:

☒ Microsoft Teams

☐ Kaltura



Situation 3: Confinement due to a new State of Alarm.

In this case, the following changes are made:

1. Educational Activities of Onsite Work:

All the foreseen activities to be developed in the classroom as indicated in this field of the guide of the subject, as well as the group and personalized tutoring, will be done with the telematic tools provided by the University, through:

☒ Microsoft Teams

☐ Kaltura

Explanation about the practical sessions:



2. System for Assessing the Acquisition of the competences and Assessment System

ONSITE WORK

Regarding the Assessment Tools:

☒ The Assessment Tools will not be modified. If onsite assessment is not possible, it will be done online through the UCVnet Campus.

☐ The following changes will be made to adapt the subject's assessment to the online teaching.

Course guide		Adaptation	
Assessment tool	Allocated percentage	Description of the suggested changes	Platform to be used

The other Assessment Tools will not be modified with regards to what is indicated in the Course Guide.

Comments to the Assessment System: