

**COURSE DATA****Data Subject**

Code	34451
Name	Medical physiology II
Cycle	Grade
ECTS Credits	6.0
Academic year	2022 - 2023

Study (s)

Degree	Center	Acad. year	Period
1204 - Degree in Medicine	Faculty of Medicine and Odontology	2	First term

Subject-matter

Degree	Subject-matter	Character
1204 - Degree in Medicine	6 - Physiology II	Obligatory

Coordination

Name	Department
VICTOR GONZALEZ, VICTOR MANUEL	190 - Physiology

SUMMARY

The aim of this discipline is to help students to acquire knowledge, skills and abilities regarding functions of organ systems related to nutrients intake (respiratory and digestive) and of the endocrine control system.

PREVIOUS KNOWLEDGE**Relationship to other subjects of the same degree**

There are no specified enrollment restrictions with other subjects of the curriculum.



Other requirements

Health Sciences High school modality, where the student gets Biology, Physics and Chemistry contents. General Physiology, Biochemistry and Medical Physiology I in the first course.

COMPETENCES (RD 1393/2007) // LEARNING OUTCOMES (RD 822/2021)

1204 - Degree in Medicine

- Understand and recognise the structure and normal function of the human body, at the following levels: molecular, tissue, organic, and of systems, in each phase of human life and in both sexes.
- Understand and recognise the effects of growth, development and aging which affect individuals and their social environment.
- Know how to use the sources of clinical and biomedical information available, and value them critically in order to obtain, organise, interpret and communicate scientific and sanitary information.
- Know how to use IT in clinical, therapeutic and preventive activities, and those of research.
- In the professional practise, take a point of view which is critical, creative, constructive and research-oriented.
- Be able to formulate hypothesis, gather information and evaluate it critically in order to solve problems by following the scientific method.
- Establish a good interpersonal communication which may allow professionals show empathy and talk to the patients efficiently, as well as to their relatives, the media and other professionals.
- Proper organisation and planning of the workload and timing in professional activities.
- Team-working skills and engaging with other people in the same line of work or different.
- Criticism and self-criticism skills.
- Capacity for communicating with professional circles from other domains.
- Acknowledge diversity and multiculturality.
- Consideration of ethics as a fundamental value in the professional practise.
- Working capacity to function in an international context.
- Knows the morphology, structure and function of skin, blood, organs and body systems: circulatory, digestive, locomotor, reproductive, excretory and respiratory systems; endocrine system, immune system, central and peripheral nervous systems.
- Knows the processes of growth, maturation and aging of the different organs and systems. Homeostasis. Adaptation to the environment.
- Handles material and the use of basic laboratory techniques.
- Knows how to carry out functional tests, determines vital parameters and interprets them.
- Knows how to perform a basic physical examination.



LEARNING OUTCOMES (RD 1393/2007) // NO CONTENT (RD 822/2021)

GENERAL OBJECTIVES:

1. **To learn science-based Medical Physiology.** Students must master effectively and efficiently study techniques self-learning strategies. From acquired knowledge, students will have to know the compensation mechanisms activated within the organism to maintain the balance of the internal environment. In this respect, the knowledge acquired in Physiology will be the basis for understanding Pathophysiology and Pharmacology.
2. **To acquire critical thinking.** Students must be critical and look for evidence on the validity of the information they handle, and the scientific basis of their knowledge. They must be able to tell which sources of information are valid.
3. **To schematize when writing and to explain orally and integrally fundamental physiological mechanisms.**
4. **To be able to tell the state of physiological function from results of laboratory exams.** To relate subjacent physiological phenomenon/phenomena with laboratory results from the Respiratory, Endocrine, and Digestive systems.
5. **To carry out practical activities in the Physiology laboratory and to prepare reports on such activities.**

SPECIFIC OBJECTIVES:

1. To know and understand: the functional organization of the respiratory system, the mechanisms responsible for lung ventilation, the gaseous exchange and the transport of gases in blood and the regulation of breathing.
2. To distinguish the mechanisms implied in the regulation of blood pH and to know the ways by which, in an integrated fashion, they are capable of buffering variations of this important constant of the internal environment.
3. To understand the importance of the digestive system for the maintenance of homeostasis. To demonstrate a thorough knowledge of the motor and secreting processes that take place in the digestive system, as well as their biological function. To master the factors that regulate the functioning of the digestive system. To know and understand the mechanisms for the digestion and absorption of different nutrients.
4. To know the main endocrine axis, their secretions and the biological function of the hormones. To understand the regulatory mechanisms of the endocrine secretion. To understand the Physiology of the gonadal axis, and the changes associated with the function of the mentioned axis in each of the stages of development. To know the spermatogenesis process, the ovarian cycle and hormonal factors that regulate such changes. To know the endocrine changes a pregnant woman experiences and the consequences of such changes. To know the fetal Physiology, the adaptation mechanisms to intrauterine life and the changes that take place after birth.
5. By putting into practice their knowledge of the Physiology of the endocrine system, students must be able to foresee the consequences of hormonal hypo or hyperfunction and to explain the mechanisms that are set in motion in order to try and maintain homeostasis. Students demonstrate they are able to evaluate the function of the endocrine system.



DESCRIPTION OF CONTENTS

1. THEORY UNITS

1. Introduction to the study of the respiratory system.
2. Lung ventilation, volumes and pulmonary flows.
3. Gas exchange in the lungs and tissues.
4. Transport of O₂.
5. Transport of CO₂.
6. Ventilation regulation.
7. Acid-base balance regulation.
8. Introduction to the digestive system Physiology.
9. Motor and secretory processes in the mouth and esophagus.
10. Gastric motility and secretions.
11. Liver physiology.
12. Pancreatic and biliary secretions.
13. Motor and secretory processes in thin intestine.
14. Motor and secretory processes in thick intestine.
15. Digestion and absorption of glycidis, proteins and lipids.
16. Absorption of vitamins, electrolytes and water.
17. Introduction to the Physiology of the endocrine system.
18. Physiology of the hypothalamic-adenohypophysis system
19. Physiology of the neurohypophysis.
20. Physiology of the endocrine pancreas.
21. Physiology of the adrenal medulla.
22. Physiology of the adrenal cortex.
23. Physiology of the thyroid.
24. Calcium and phosphate metabolism.
25. Physiology of the testicle.
26. Physiology of the ovary and endometrial cycle.
27. Physiology of the ovary and endometrial cycle II.
28. Fertilization, embryo implantation and nutrition. Functions of the placenta.
29. Gestation, childbirth and lactation.
30. Fetal, neonatal and growth Physiology.

2. LABORATORY PRACTICE UNITS

1. Respiratory auscultation: respiratory auscultation focus.
2. Recognition and analysis of different breath sounds.
3. Simple spirometry.
4. Forced spirometry. Results interpretation.
5. Blood and urinary pH regulation
6. Parameters evaluation influencing intestinal motility.
7. In vitro digestion.
8. Functional exploration of the digestive system.



9. Anthropometry. Interpretation of growth curves.
10. Determination of blood glucose. Curve of glucose tolerance.
11. Functional assessment of the endocrine system.

The practical classes are designed in compliance with international standards on the use of animals in teaching and experimentation.

Rules regarding practical classes:

- It is mandatory to attend at least 80% of practical classes.
- Attendance will be monitored by a roll call.
- If a student is late, he/she will not be allowed to join the class once it has begun.
- If there are extenuating circumstances (which can be proven in writing) due to which a student is late or cannot attend a practical class, the member of teaching staff responsible for the group will be asked to authorize the student to take the missed class(es) at another time. Without said authorization, students cannot attend the classes of other groups.
- Students who are repeating the subject may attend practical classes if they wish, although attendance is not compulsory.

3. TUTORIALS

Participation in group assignments is mandatory.

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	33,00	100
Laboratory practices	23,00	100
Tutorials	4,00	100
Development of group work	4,00	0
Study and independent work	50,00	0
Readings supplementary material	5,00	0
Preparation of evaluation activities	10,00	0
Preparing lectures	10,00	0
Preparation of practical classes and problem	10,00	0
Resolution of case studies	1,00	0
TOTAL	150,00	



TEACHING METHODOLOGY

The teaching methodology of the subject is as follows:

- Theoretical classes (30 Thematic units). Lectures in which the teacher will present, in a structured form, the most important concepts and contents of the discipline. The objective is for students to acquire knowledge, skills and deductive reasoning ability. If the teacher deems it necessary, the didactic material used will be made available for students through the Virtual Classroom. Students' participation will be potentiated.

- Laboratory Classes (11 Thematic units).

The teacher will present the objectives, report on material handling, monitor job performance and help the interpretation of results. The aim is to use practical teaching to acquire new knowledge and/or consolidate the theoretical knowledge, acquire skills, abilities and aptitudes.

- Tutorials.

Students will be organized into small working groups to which topics, case reports and / or tasks are proposed to allow them to elaborate on the theoretical and / or practical program of Medical Physiology II. The work is coordinated by the teacher, taking place later oral presentation and / or discussion. The objectives to be achieved are:

- a) Development of the necessary skills to produce a high quality work.
- b) Promote cooperative work, responsibility strategies, self-learning and self-thinking, and finally discuss all the material.
- c) Learn to summarize, contrast information, and the of truthful literature sources.
- d) Establish, deepen and expand knowledge, aptitudes, and skills.
- e) Promote student-teacher relationship.

EVALUATION

Theory evaluation: 60% of the final qualification. Evaluation will be based on a written test (final exam) that reflects the contents of the theory programme and whose aim is to assess the student's acquisition of knowledge.

Practical evaluation: 40% of the final qualification. Evaluation will be based on: 1) a written test (final exam) that evaluates the acquisition of skills related to general and specific competences (30% of the final mark); and 2) continuous assessment of the student's attitude, participation, and skill and knowledge acquisition in practical classes and the work carried out in tutored groups (10% of the final mark).



Final exam. With a maximum mark of 9 points, this exam will evaluate the acquisition of theory and practical knowledge. It consists of a written test of 60 multiple choice questions with 4 possible answers, of which only one is correct or corresponds most closely with the statement. Each correctly answered question will receive 0.15 points, and for every wrong answer one fourth of this score will be subtracted. Unanswered questions will not be penalized. The contents of the exam will be the same for all groups.

Attendance to practical sessions is mandatory. Unjustified non-attendance to more than 20% of the sessions will make it impossible to pass the course.

Students are reminded of the importance of carrying out evaluation surveys on all the teaching staff of the degree subjects.

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