

Medical Physiology I

Code: 102957
ECTS Credits: 8

Degree	Type	Year	Semester
2502442 Medicine	FB	2	1

Contact

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Use of Languages

Principal working language: catalan (cat)
Some groups entirely in English: No
Some groups entirely in Catalan: No
Some groups entirely in Spanish: No

Teachers

Enrique Domingo Ribas
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Prerequisites

To take Medical Physiology I subject, it is recommended that the student should acquire the basic knowledge and competence on the structure and organization of the human body and its body systems, particularly in the subjects of Cell Biology, Biochemistry and Molecular Biology, and Biophysics. It is also necessary to have completed and achieved the basic knowledge and competence of the General Physiology subject of the first year.

Objectives and Contextualisation

The Medical Physiology I subject is programmed during the second semester of the second year of the Degree of Medicine and develops the knowledge of the normal function of the following systems of the human body: circulatory, renal/urinary, respiratory and digestive.

The acquisition of the basic competence of this subject will allow the student to understand the normal function of the systems and to confront the study of the physiopathology and the understanding of the mechanisms of diseases that affect the different systems of the human body during the next years.

The general training objectives of the subject are:

- To understand the basic concepts of physiology of the circulatory, respiratory, renal/urinary and digestive systems of the human body in health, as well as the mechanisms of adaptation to the environment.
- To acquire a comprehensive and integrated view of the interrelations of the different systems of the body.
- To integrate the Physiology knowledge with concepts learned in other basic subjects, that deal with the structure and the cellular and molecular aspects of the organism, to achieve a global vision of the functioning of the human body.
- To train the student to apply the physiological knowledge in deducing the consequences of the diseases.
- To acquire practical skills in each one of the fields of Physiology for performing the most frequent functional tests in the biomedical field.
- To acquire attitudes aimed at the promotion of health and the prevention of disease, oriented towards health medicine, and appropriate for a medical practice based on scientific evidence.

Competences

- Critically assess and use clinical and biomedical information sources to obtain, organise, interpret and present information on science and health.
- Demonstrate basic research skills.
- Demonstrate knowledge of the principles and physical, biochemical and biological processes that help to understand the functioning of the organism and its disorders.
- Demonstrate understanding of the basic sciences and the principles underpinning them.
- Demonstrate understanding of the causal agents and the risk factors that determine states of health and the progression of illnesses.
- Demonstrate understanding of the functions and interrelationships of body systems at different levels of organisation, homeostatic and regulatory mechanisms, and how these can vary through interaction with the environment.
- Demonstrate understanding of the structure and function of the body systems of the normal human organism at different stages in life and in both sexes.
- Demonstrate, in professional activity, a perspective that is critical, creative and research-oriented.
- Formulate hypotheses and compile and critically assess information for problem-solving, using the scientific method.
- Indicate the basic diagnosis techniques and procedures and analyse and interpret the results so as to better pinpoint the nature of the problems.
- Organise and plan time and workload in professional activity.
- Perform the basic practical procedures of examination and treatment.
- Use information and communication technologies in professional practice.

Learning Outcomes

1. Analyse the functional mechanisms that help the organism to adapt to the main environmental variations.
2. Apply knowledge of physiology to the production of structured review texts.
3. Demonstrate basic research skills.
4. Demonstrate, in professional activity, a perspective that is critical, creative and research-oriented.
5. Describe the general organisation and function of the systems of the human body in health.
6. Describe the interrelationship between the different body systems in the maintenance of homeostasis and good health.
7. Formulate hypotheses and compile and critically assess information for problem-solving, using the scientific method.
8. Identify physiological information sources, including textbooks, atlas images, internet resources and other specific bibliographic databases.
9. Identify the basic mechanisms of cell and tissue physiology.
10. Identify the basic principles of human nutrition.
11. Identify the functional disorders at the level of each system that cause various types of diseases.

12. Identify the functional variations of the human organism at different stages in life and their principal causes.
13. Identify the main experimental techniques in physiology and their usefulness to basic and applied research.
14. Identify the main techniques used in physiology laboratories.
15. Identify the scientific bases of human physiology.
16. Indicate techniques of functional studies that are appropriate for diagnosis and evaluation of biomedical procedures.
17. Interpret normal and abnormal results of techniques of functional studies of body systems.
18. Make correct use of the international physiological nomenclature.
19. Organise and plan time and workload in professional activity.
20. Perform basic techniques for the examination and functional assessment of physiological systems.
21. Relate the cell and tissue characteristics of the organs and systems of the body to their function.
22. Use information and communication technologies in professional practice.

Content

CIRCULATORY SYSTEM

INTRODUCTION

MYOCARDIUM PHYSIOLOGY

ELECTRICAL ACTIVITY OF THE HEART

CARDIAC CYCLE

REGULATION OF CARDIAC FUNCTION

NORMAL HEMODYNAMICS OF VENOUS SYSTEM

NORMAL HEMODYNAMICS OF ARTERIAL SYSTEM

MICROCIRCULATION

CAPILLARY AND LYMPHATIC SYSTEM

REGULATION OF ARTERIAL PRESSURE

CORONARY CIRCULATION

CEREBRAL CIRCULATION

CUTANEOUS CIRCULATION

SPLANCHNIC CIRCULATION

RESPIRATORY SYSTEM

INTRODUCTION

VENTILATION PHYSIOLOGY

PULMONARY VENTILATION

PULMONARY CIRCULATION

GAS EXCHANGE IN LUNGS

BLOOD TRANSPORT OF GASES

BREATH REGULATION
RENAL/URINARY SYSTEM AND BODY FLUIDS
GENERAL KIDNEY FUNCTIONS
GLOMERULAR HEMODINAMICS
MEASURING RENAL FUNCTION
URINARY CONCENTRATION MECHANISMS
VOLUME AND OSMOLARITY FLUID BALANCE
RENAL REGULATION OF ACID-BASE BALANCE
PHYSIOLOGY OF URINARY EXCRETION. MICTURITION
DIGESTIVE SYSTEM
FOOD INTAKE
GASTRIC MOTILITY
INTESTINAL MOTILITY
DIGESTIVE SECRETION
SALIVARY SECRETION
GASTRIC SECRETION
INTESTINAL SECRETIONS
DIGESTION AND ABSORPTION
LIVER PHYSIOLOGY

Methodology

Methodology

Theory classes:

A systematic explanation of the subject topics, giving relevance to the most important concepts. The student acquires the basic scientific knowledge of the subject in theory classes, which will be complemented by self-study of the themes of the subject program.

Laboratory practices:

Practical sessions for the observation and performance of procedures, the practical learning of physiological techniques, and their medical application. Group work and active self-learning promoted.

Case-based work:

Work on cases and problems of relevance for learning the subject. The knowledge acquired in theory classes, practices and personal study is applied to the resolution of practical cases presented using the moodle application.

Tutorial teaching:

Availability of tutorials for helping in the independent study of physiological concepts and application for the resolution of cases.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
CASE RESOLUTION WORK (PAUL)	5	0.2	1, 2, 4, 7, 11, 8, 17, 19
LABORATORY PRACTICES (PLAB)	21	0.84	1, 3, 7, 13, 16, 17, 19, 20
THEORY (TE)	44	1.76	1, 5, 6, 10, 11, 8, 13, 12, 16, 20, 21
Type: Supervised			
TUTORIALS	20	0.8	1, 7, 11, 8, 16, 22
Type: Autonomous			
PREPARATION OF CASE-BASED WORK AND PRACTICES	20	0.8	1, 2, 3, 4, 5, 6, 7, 15, 9, 10, 11, 8, 13, 14, 12, 16, 17, 19, 20, 21, 18, 22
SELF STUDY	80	3.2	1, 6, 7, 9, 11, 8, 13, 16, 17, 19, 20

Assessment

The evaluation of the subject will be based on the theoretical and practical syllabus contained in the Program.

1. Evaluation model:

Each block or system that integrates the program of the subject will be evaluated individually, both from the theoretical and practical syllabus (including laboratory and case practices).

Systems for evaluation in Medical Physiology I are considered:

- 1) CIRCULATORY SYSTEM
- 2) RESPIRATORY SYSTEM
- 3) RENAL/URINARY SYSTEM AND BODY FLUIDS
- 4) DIGESTIVE SYSTEM

To pass the subject, each of the two blocks must be passed with a minimum mark of 5.0.

Throughout the course there will be several tests, two partial exams, and a final exam.

2. Continuous evaluation:

Two partial exams will be programmed in order to evaluate the two blocks of the subject:

- 1) CIRCULATORY SYSTEM and RESPIRATORY SYSTEM
- 2) RENAL/URINARY SYSTEM AND BODY FLUIDS and DIGESTIVE SYSTEM

The continuous evaluation of each system will consist of three components:

A. Partial examination consisting in:

- Multiple choice questions to evaluate the theoretical concepts of the subject. The mark of this exam will be 75% of the overall grade of the system.
- Multiple choice questions and/or short written questions of the concepts learned and trained in laboratory practices, performed the same day as the theoretical exam. The mark of this part will be 15% of the overall grade of the block.

Hence, the mark of the whole part A will be 90% of the overall grade of the system.

B. Tests throughout the course on the knowledge obtained in the laboratory practices and the case-based study. There will be

- Evaluation of laboratory practice concepts, by means of on-site tests and/or questionnaires conducted in the Moodle application.
- Evaluation of case resolution work, by means of on-site tests and/or questionnaires conducted in the Moodle application.

The mark of this set of tests will be 10% of the final grade of the system.

In order to pass each system, it is necessary to obtain a minimum of 5.0 in the theoretical and practical knowledge examination of the subject (section A) and a minimum of 5.0 in the set of tests of section B.

To pass the complete subject, each one of the systems must be passed with a minimum of 5.0, so that the average is higher than 5.0. In this case, the final qualification will be the average of the marks obtained in each of the approved systems.

3. Final exam:

A final examination for recovery will be carried out, in which the student will have to attend only to the blocks that they have not passed in the continuous evaluation of the same academic year.

According to the general regulations of the University, to participate in the final examination, the student must have been previously evaluated in a set of activities whose weight equals to a minimum of two thirds of the total qualification of the subject.

Students who have passed the continuous evaluation of the subject and want to attend to this final exam to improve their qualification must request this option in the dates specified in the call. In this case, the final grade will be the highest mark obtained in either the continuous evaluation or the final exam.

The final examination of each system will consist of tests of multiple choice questions and will comprehend the knowledge of:

- Theory: The mark of this part will be 75% of the final grade.
- Laboratory and case-based practices: The mark of this part will be 25% of the final grade.

To pass each block students need to get a minimum of 5.0 between these two parts.

To pass the subject, students need to pass the two systems with a minimum mark of 5.0. In this case, the final mark will be the average of the marks obtained in each of the approved systems. If the two systems are not passed, the maximum mark obtained will be 4.8.

It will be considered "not assessable" the student who does not take the scheduled partial and final exams.

4. Exams reviewing procedure:

Students may submit claims to the statement of the exam questions during the two days following the completion of the examination.

The revision of the marks will be carried out in the schedule that will be announced together with the publication of the qualifications of the partial and final exams.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Practical evaluation and/or questionnaires in Moodle application	10%	1	0.04	1, 3, 4, 6, 7, 9, 10, 11, 8, 12, 16, 17, 19, 20, 21, 18, 22
Written evaluation through objective tests:4 tests of multiple choice questions of theoretical knowledge (75%) and multiple choice questions and 8 tests of restricted questions essay tests of the knowledge of practices (15%)	90%	9	0.36	1, 2, 4, 5, 6, 15, 9, 10, 11, 13, 14, 12, 19, 21

Bibliography

- BERNE R, LEVY M. Fisiología (6ª ed.). Elsevier-Mosby, 2009.
- GUYTON AC, HALL JE. Tratado de Fisiología Médica (13ª ed.). Elsevier-Saunders, 2016.
- TRESGUERRES JAF. Fisiología Humana (4ª ed.). Mc Graw Hill-Interamericana, 2010.
- WEST JB. Fisiología Respiratoria (8ª ed.). Panamericana, 2009.