

General Physiology

Code: 106730
ECTS Credits: 3

Degree	Type	Year	Semester
2502442 Medicine	FB	1	2

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

Joaquim Hernández Martín
Roser Velasco Fargas
Mireia Herrando Grabulosa
Ruben Lopez Vales

Prerequisites

No official prerequisites are defined for this subject. However, it is recommended that the student has acquired the basic knowledge and competences of the subjects corresponding to *Cell Biology*, *Biochemistry* and *Molecular Biology*, and *Biophysics*.

Objectives and Contextualisation

The General Physiology subject is programmed during the second semester of the first course of the Degree of Medicine and develops the knowledge of the basic principles of the function of cells and tissues of the human organism. The acquisition of the competences of this subject will allow the student to be well prepared to confront the study of the physiology of the different systems of the human body during the second course.

The general training objectives of the subject are:

- To know the basic mechanisms of the functioning of the body tissues.
- 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 train the student to apply the physiological knowledge in deducting the consequences of the diseases.
- To acquire practical skills 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

- Communicate clearly, orally and in writing, with other professionals and the media.
- 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 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.
- Organise and plan time and workload in professional activity.

Learning Outcomes

1. Apply knowledge of physiology to the production of structured review texts.
2. Communicate clearly, orally and in writing, with other professionals and the media.
3. Demonstrate basic research skills.
4. Describe the function and characteristics of the different components of blood.
5. Describe the function of the different body compartments.
6. Describe the general organisation and function of the systems of the human body in health.
7. Explain the basic functional mechanisms of the different cell types and the tissues they make up.
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 functional variations of the human organism at different stages in life and their principal causes.
11. Identify the main techniques used in physiology laboratories.
12. Identify the scientific bases of human physiology.
13. Make correct use of the international physiological nomenclature.
14. Organise and plan time and workload in professional activity.

Content

INTRODUCTION TO PHYSIOLOGY

TRANSPORT OF IONS THROUGH THE CELL MEMBRANE

PHYSIOLOGY OF EPITHELIAL CELLS

CELL ELECTRICAL PHENOMENA

SYNAPTIC TRANSMISSION

PHYSIOLOGY OF SKELETAL MUSCLE

PHYSIOLOGY OF CARDIAC MUSCLE

PHYSIOLOGY OF SMOOTH MUSCLE

PHYSIOLOGY OF BLOOD AND HEMATOPOIETIC ORGANS

BLOOD PLASMA

ERYTHROCYTES

LEUKOCYTES

LYMPHOCYTES AND IMMUNITY

BLOOD GROUPS

HEMOSTASIS

[Detailed contents are provided in the Subject Program]

Methodology

Theory classes:

Systematic explanation and study 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 are promoted.

Case-based work:

Work on cases or 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 autonomous study of physiological concepts and application for the resolution of cases throughout the semester.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
LABORATORY PRACTICES (PLAB)	8.5	0.34	3, 10, 14
THEORY (TE)	18	0.72	9, 10, 14
Type: Supervised			
CASE RESOLUTION WORK	2	0.08	9, 10, 14
TUTORIALS	3	0.12	9, 10, 14
Type: Autonomous			
PREPARATION OF WRITTEN WORKS / READING OF ARTICLES	7.5	0.3	3, 9, 10, 14
SELF STUDY	30	1.2	3, 9, 10, 14

Assessment

EVALUATION

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

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 General Physiology are considered:

- Physiology of Blood and Hematopoietic Organs
- Physiology of Nerve, Muscle and Epithelia

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

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

Continuous evaluation:

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 from 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 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 questionnaires conducted in the Moodle application. The mark of this set of tests will be 5% of the final grade of the system
- Questionnaires on case resolution and practical problems, made in the Moodle application. The mark of this set of tests will be 5% 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 global score of the system (90% exam A + 10% questionnaires B)

To pass the full subject, each one of the systems must be approved with a minimum of 5.0. In this case, the final qualification will be the weighted average (for the extension of the systems) of the marks obtained in each of the approved systems.

Final exam:

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

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 on 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 system students need to get a minimum of 5.0 of 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 weighted average (for the extension of the system) 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.

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
Objective tests on practical knowledge	15%	0.5	0.02	2, 3, 6, 4, 9, 11, 10, 13
Objective tests on theory knowledge	75%	3.5	0.14	2, 6, 5, 4, 7, 12, 9, 8, 10, 14, 13
Practical learning evaluation	5%	1	0.04	1, 3, 6, 4, 12, 9, 11, 10, 14, 13
Questionnaires on case and problem solving	5%	1	0.04	1, 3, 6, 5, 4, 7, 12, 9, 8, 11, 10, 14, 13

Bibliography

TEXTBOOKS

- Koeppen BM, Stanton B. Berne & Levy Physiology. 7th ed. Elsevier, 2017.
- Hall JE. Guyton Textbook of Medical Physiology. 14th ed. Elsevier; 2021.
- Purves D. Neuroscience. 6th ed. Sinauer; 2018.
- Paulev PE, Zubieta G. New Human Physiology, 2nd ed. <https://www.zuniv.net/physiology/book/>

Software

LABCHART <https://www.adinstruments.com/>

Nernst/Goldman Simulator <https://apps.apple.com/us/app/nernst-goldman-equation-simulator/id1022504095>