

**Diagnostic Imaging and Function of the Human Body I**

Code: 106097  
ECTS Credits: 3

Degree	Type	Year	Semester
2500891 Nursing	FB	1	1

## Contact

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## Teaching groups languages

You can check it through this [link](#). To consult the language you will need to enter the CODE of the subject. Please note that this information is provisional until 30 November 2023.

## Teachers

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Natalia Lago Perez

Nuria Benseny Cases

## Prerequisites

It is desirable that the student has acquired basic knowledge and skills about the structure and organization of the human body and its cellular systems, as well as basic knowledge of Physics and Chemistry.

## Objectives and Contextualisation

The subject *Image Diagnosis and Function of Human Body I* is programmed during the first half of the first semester of the first year of the Degree of Nursing and develops the knowledge of the physical, physiological and physiopathological bases of the human organism.

The basic learning objectives are:

- To learn the physical bases and basic concepts of the physiology of the different functional systems of the human body in a state of health.
- To acquire a complete and integrated vision of the interrelations of the different systems of the organism.

- To integrate the knowledge of Biophysics and Physiology with those acquired in other basic subjects, which deal with the structure and the cellular and molecular aspects of the organism, in order to achieve a global vision of the functioning of the human body.
- To achieve a better understanding of the basic concepts of the effects of the interaction of radiation with living beings and radioprotection.
- To train the student to apply the physiological knowledge in the deduction of the consequences of the diseases.
- To acquire the practical skills in each of the necessary areas for the performance of the most frequent functional studies techniques in the biomedical field.
- To acquire attitudes aimed at the promotion of health and the prevention of disease, oriented to health medicine, and appropriate to the practice based on scientific evidence.

## Competences

- Make changes to methods and processes in the area of knowledge in order to provide innovative responses to society's needs and demands.
- Offer technical and professional health care and that this adequate for the health needs of the person being attended, in accordance with the current state of scientific knowledge at any time and levels of quality and safety established under the applicable legal and deontological rules.
- Students must have and understand knowledge of an area of study built on the basis of general secondary education, and while it relies on some advanced textbooks it also includes some aspects coming from the forefront of its field of study.
- Take sex- or gender-based inequalities into consideration when operating within one's own area of knowledge.

## Learning Outcomes

1. Acquire and use the necessary instruments for developing a critical and reflective attitude.
2. Analyse differences by sex and gender inequality in ethiology, anatomy, physiology. Pathologies, differential diagnosis, therapeutic options, pharmacological response, prognosis and nursing care.
3. Describe safety measures in the application of radiation.
4. Describe the molecular and physiological bases of cell and tissues.
5. Identify interactions of electromagnetic waves and radiation in the human body.
6. Identify the physiological functioning of the human body and the homeostatic mechanisms that regulate it.
7. Identify the tests and explorations using imaging diagnosis used in different physiopathological changes.
8. Students must have and understand knowledge of an area of study built on the basis of general secondary education, and while it relies on some advanced textbooks it also includes some aspects coming from the forefront of its field of study.

## Content

### A. BIOPHYSICS

#### 1. INTERACTION OF WAVES AND RADIATIONS WITH THE LIVING BEING.

- ELECTROMAGNETIC WAVES, RADIATIONS AND ULTRASOUNDS. PHYSICAL BASES AND SOME APPLICATIONS IN DIAGNOSIS AND THERAPY:

- TC (Computed tomography for obtaining anatomical images in three dimensions for diagnosis, examples in the detection of tumors)
- GAMMAGRAPHIES (use of radiation examples of the detection of bone pathologies)

- SPECT AND PET three-dimensional images for diagnosis with functional information, examples in the detection of tumors and detection of markers in neurodegenerative diseases)
- EXTERNAL, INTERNAL OR ENDOCAVITARIAN RADIOTHERAPY
- ECOGRAPHY

- DOSE AND RADIOPROTECTION

## 2. PHYSICAL BASIS OF DIALYSIS AND OSMOSIS.

- FICK'S LAW
- DIFFUSION THROUGH MEMBRANES. OSMOSIS AND DIALYSIS
- BIOLOGICAL IMPORTANCE. BIOMEDICAL EXAMPLES.

## B. PHYSIOLOGY

### GENERAL PHYSIOLOGY

- ION TRANSPORTATION THROUGH THE CELLULAR MEMBRANE
- CELL ELECTRICAL PHENOMENA
- SYNAPTIC TRANSMISSION
- MUSCLE EXCITATION AND CONTRACTION
- PHYSIOLOGY OF EPITHELIAL CELLS
- FUNCTIONS OF SKIN PROTECTION

## Methodology

ACTIVITY TYPE	ACTIVITY	HOURS
Directed (35%)	Theory classes with ICT support	13
	Instrumental laboratory practices	6
	Classroom practices: seminars for presentation and discussion of cases and problems	6
Supervised (10%)	Support tutorials for the understanding of the subject and development of the marked learning objectives	7,5
Autonomous (50%)	Preparation of case and problem seminars: analysis of the problem, information search, writing answers, preparation of the presentation	10
	Preparation of the objectives of knowledge and skills proposed. Search for information, realization of diagrams and summaries and conceptual assimilation	27,5
	Personal study	
Evaluation (5%)	Written tests	5
	Continuous and formative assessment	

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			
Case-resolution Work (PAul)	6	0.24	
Laboratory practices (PLab)	6	0.24	
Theory classes (TE)	13	0.52	
Type: Supervised			
Tutorials	7.5	0.3	
Type: Autonomous			
Personal study	37.5	1.5	

## Assessment

The evaluation of the subject will be based on the theoretical and practical syllabus detailed in the guide. The subject is structured in two blocks, Biophysics, which will represent 66.6% of the final grade, and Physiology, which will represent 33.3%, according to the contribution of these two subjects.

The competencies of this subject will be assessed by:

- Continued evaluation:

Partial evaluations will be carried out during the course, for the different sections of the program. The subject is divided into two blocks:

### 1) Biophysics (66.66% overall)

Partial exam (95% of the mark of the Biophysics part -63.33% of the overall subject-).

The assessment in the midterm exam will consist of an objective test with multiple-choice items, which will assess the knowledge taught in theory classes and classroom and laboratory practices.

Assessment of attendance at laboratory practices and delivery of the internship questionnaire: 5% of the grade for the Biophysics part -3.33% of the overall subject.

### 2) Physiology (33.33% overall)

The evaluation will consist of:

- Partial exam (75% of the Physiology section grade -25% of the overall subject grade-), through an objective test with multiple-choice items, covering theoretical concepts and practical exercises from the program.

- Evaluation of seminars and laboratory practices (25% of the Physiology section grade -8.33% of the overall subject grade-), through questionnaires on the cases and problems discussed in the seminars or classroom exercises, as well as laboratory practices.

It is necessary to obtain a minimum grade of 5.0 in the partial exam in order to incorporate the evaluation grade of seminars and practices.

### 3) Overall rating

It is an essential requirement to obtain a grade equal to or higher than 4.0 in each of the two written assessments (partial exams) in order to pass the subject.

The grade for the subject will correspond to the weighted average, 66.6% to that obtained in the Biophysics block and 33.3% to that of Physiology.

To pass the course you must obtain a minimum of 5.0 in the final grade.

- Final recovery test:

Students who have not passed the subject by means of the continuous evaluation will be able to present to a final examination of recovery, where the student will only have to present in the blocks that have not surpassed in the continuous evaluation of the same course. academic.

The recovery exam will be performed in all cases with objective tests with multiple choice items from each block.

To pass the subject it will be necessary to obtain a grade equal to or higher than 4.0 in the examination of each of the two blocks. The grade for the subject will correspond to the weighted average, 66.6% to that obtained in the Biophysics block and 33.3% to that of Physiology.

The subject will be considered passed when the final grade is equal to or higher than 5.0.

It will be considered "non-assessable" when there is insufficient evidence to allow an overall assessment of the subject. In order to be able to evaluate the subject in a global way, you must have evaluation results of the two blocks into which it is divided (from the two partial exams and / or the final recovery exam).

- Single Evaluation:

The single evaluation will consist of a synthesis test in two blocks:

1) Biophysics (66.66% of the total).

Objective test with multiple-choice items to evaluate theoretical knowledge of the subject (90% of the grade for the biophysics block).

Objective test with multiple-choice items to evaluate concepts related to laboratory practices and classroom practices (10% of the grade for the biophysics block).

2) Physiology (33.33% of the total).

Objective test with multiple-choice items to evaluate theoretical knowledge of the subject (75% of the grade for the physiology block).

Objective test with multiple-choice items and/or restricted written questions on concepts related to laboratory practices and case studies in classroom practices (25% of the grade for the physiology block).

To pass the physiology block, a minimum grade of 4.0 must be obtained in each of these two tests.

Overall grade for the unique evaluation: It is essential to obtain a grade equal to or higher than 4.0 in each of the two blocks (Biophysics and Physiology) in order to pass the course.

The course grade will be the weighted average, with 66.6% based on the grade obtained in the Biophysics block and 33.3% based on the grade obtained in the Physiology block.

To pass the course, a minimum grade of 5.0 must be obtained in the overall grade.

The unique evaluation test will be scheduled to coincide with the date set for the second partial of the continuous assessment.

Recovery exam: Students who have not passed the course through the unique evaluation will have the opportunity to take a final recovery exam. The exam will have the same characteristics as the first session. The requirements to pass the course will be the same as in the first session of the unique evaluation.

## Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Biophysics Block - Practice: essay tests of restricted questions / resolution of problems	28,66%	1	0.04	1, 2, 3, 5, 7, 8
Biophysics Block - Theory: written evaluation through objective tests: multiple-choice questions	38%	2	0.08	1, 2, 3, 5, 7, 8
Physiology Block - Practice: written evaluation through objective tests: multiple choice questions / restricted questions essay tests / problem solving	8,33%	1	0.04	1, 2, 4, 6, 8
Physiology Block - Theory: evaluation through objective tests: multiple-choice questions	25%	1	0.04	1, 2, 4, 6, 8

## Bibliography

- FRUMENTO, AS. Biofísica. 3a ed. Madrid: Mosby/Doyma Libros S.A.; 1995.
- JOU D, LLEBOT JE, PEREZ-GARCÍA C. Física para ciencias de la vida. 2a ed. Madrid: McGraw-Hill; 2009.
- TORTORA GJ, DERRICKSON B. Principios de anatomía y fisiología. 13 ed. 2013. (also available as a digital resource, through *biblioteca de la UAB*)
- COSTANZO LS. Fisiología. 6a ed. Barcelona: Elsevier-Saunders; 2018. (also available as a digital resource, through *biblioteca de la UAB*)

## Software

No specific software is needed