

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

Code: 106097

ECTS Credits: 3

Degree	Type	Year	Semester
2500891 Nursing	FB	1	1

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

**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**

Josep Bartomeu Cladera Cerdà

**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

- Develop critical thinking and reasoning and communicate ideas effectively, both in the mother tongue and in other languages.
- Generate innovative and competitive proposals for research and professional activities.
- 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.

## 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. Argue with scientific evidence selecting those most suitable nursing care for adequate professional attention to the health needs of people.
4. Describe safety measures in the application of radiation.
5. Describe the molecular and physiological bases of cell and tissues.
6. Identify health needs during the different stages of the life cycle, from the moment of birth to the end of life.
7. Identify the physiological functioning of the human body and the homeostatic mechanisms that regulate it.
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. PHYSICAL BASIS OF DIALYSIS AND OSMOSIS.

- FICK'S LAW
- DIFFUSION THROUGH MEMBRANES. OSMOSIS PHENOMENA IN MEMBRANES
- DIALYSIS PHENOMENA
- BIOLOGICAL IMPORTANCE

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

##### - ELECTROMAGNETIC WAVES AND RADIATIONS. 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

##### - DOSE AND RADIOPROTECTION

### 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	

This year the subject will follow the modality of mixed teaching (presential teaching prioritized by practical activities and evaluations, and the rest of the subject will remain under online teaching modality).

## Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Case-resolution Work (PAul)	6	0.24	1, 2, 3, 4, 7, 6, 8
Laboratory practices (PLab)	6	0.24	1, 2, 5, 4, 7, 6, 8
Theory classes (TE)	13	0.52	2, 5, 4, 7, 6, 8
Type: Supervised			
Tutorials	7.5	0.3	1, 2, 3, 5, 4, 7, 6, 8
Type: Autonomous			

Personal study	37.5	1.5	1, 2, 3, 5, 4, 7, 6, 8
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## Assessment

The evaluation of the subject will be based on the theoretical and practical topics detailed in the guide. The subject is structured in two blocks, Biophysics, which will represent 66.6% of the final mark, and Physiology, which will represent 33.3% in accordance with the weight of these two matters.

The competences of this subject will be evaluated by means of:

- Continued evaluation:

There will be partial assessments during the course, for the different sections of the program. The subject is divided into two blocks:

### 1) Biophysics (66,66% global)

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

The evaluation in the partial exam will consist of two parts:

- a first part where the theoretical knowledge will be evaluated by means of objective tests with multiple choice items (60% of the mark of the exam -38% of the total of the subject).
- A second part where the seminars will be evaluated by solving problems with restricted questions (40% of the exam's grade -25.33% of the total of the subject).

Evaluation of the laboratory practices (5% of the grade from the part of Biophysics -3.33% of the global of the subject-):

Attendance and delivery of the questionnaire about the knowledge and skills developed at the laboratory practices

### 2) Physiology (33,33% global)

Partial exam (75% of the note from Physiology -25% of the subject's total):

The evaluation will consist of a partial exam through objective tests with multiple choice items. This exam will assess the understanding and knowledge of the concepts that the student must have acquired both in the theoretical classes and practical classes, as well as in their own self-learning. The result of this test will be 75% of the final note of Physiology.

Evaluation of seminars and laboratory practices (25% of the note from Physiology -8.33% of the overall of the subject-):

- cases and problems worked in the seminars or the case-resolution works, through presentation of works and / or questionnaires
- knowledge and practical skills, through presentation of results, questionnaires and / or written tests.

It is necessary to obtain a minimum of 4.0 in the partial theory exam in order to be able to incorporate this evaluation grade of seminars and practices.

It is essential to obtain a grade equal to or higher than 4.0 in each written evaluation (partial exams) to pass the subject.

The subject mark will correspond in 66.6% to that obtained in the Biophysics block, and in 33.3% of the Physiology block. To pass the subject, you must obtain a minimum of 5.0 in the final grade.

- Final recovery test:

Students who have not passed the subject through continuous evaluation may submit to a final recovery exam, where the student will only have to submit to the blocks he /she has not passed in the continuous evaluation exams of the same academic year.

- The recovery test will be carried out in all cases with objective tests with multiple-choice items of each block.

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

It will be considered as "non-evaluable" when there is not enough evidence to allow a global evaluation of the subject. In order to evaluate the subject comprehensively, you must have evaluation results of the two blocks in which it is divided (from the two partial exams and / or the final recovery exam).

## 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, 3, 5, 4, 6, 8
Biophysics Block - Theory: written evaluation through objective tests: multiple-choice questions	38%	2	0.08	1, 3, 5, 4, 6, 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, 3, 5, 7, 6, 8
Physiology Block - Theory: evaluation through objective tests: multiple-choice questions	25%	1	0.04	1, 2, 3, 5, 7, 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*)