

Degree programme	Type	Course
Nursing	FB	1

Contact lecturer

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Group languages

You can consult this information at the [end](#) of the document.

Prerequisites

It is advisable that the student has acquired basic knowledge and skills regarding the structure and organization of the human body and its cellular systems, as well as basic knowledge of Physics and Chemistry. More specifically:

- Solving first-degree equations
- Basic concepts needed for the topic of ultrasound and electromagnetic waves:
 - Wave
 - Electric field
 - Magnetic field
- Basic concepts needed for the topic of radioactivity:
 - Structure of the atom
 - Isotope
- Basic concepts needed for the topic of diffusion:
 - Molecule
 - Chemical bond
 - Electrolyte

Objectives

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 as well as that of the physical bases of diagnostic imaging techniques.

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.

Learning outcomes

- CM01 (Perform physical examinations using devices and systems.) Perform physical examinations using devices and systems.
- CM02 (Apply the appropriate health technologies to each clinical case or health situation.) Apply the appropriate health technologies to each clinical case or health situation.
- KM01 (Define the structure and function of the human body.) Define the structure and function of the human body.
- KM02 (Recognise the molecular and physiological foundations of cells and tissues.) Recognise the molecular and physiological foundations of cells and tissues.
- KM04 (Recognise the physical foundations of diagnostic imaging.) Recognise the physical foundations of diagnostic imaging.

Contents

1- DIAGNOSTIC IMAGING

- ELECTROMAGNETIC WAVES, RADIATION AND ULTRASOUND. PHYSICAL PRINCIPLES AND SOME APPLICATIONS IN DIAGNOSIS AND THERAPY:
- CT (Computed Tomography for obtaining three-dimensional anatomical images for diagnosis; examples in tumor detection)
- GAMMA SCINTIGRAPHY (use of radiotracers; examples in the detection of bone disorders)
- SPECT AND PET (three-dimensional imaging techniques providing functional information for diagnosis; examples in tumor detection and detection of biomarkers in neurodegenerative diseases)
- RADIOTHERAPY
- ULTRASOUND IMAGING
- DOSE AND RADIATION PROTECTION

2. HUMAN BODY FUNCTION

- DIFFUSION:
- Fick's Law
- Diffusion through membranes: osmosis and dialysis phenomena
- Biological importance: biomedical examples

- GENERAL PHYSIOLOGY:
- Ion transport across the cell membrane
- Cellular electrical phenomena
- Synaptic transmission
- Muscle excitation and contraction
- Physiology of epithelial cells
- Skin protective functions

Learning activities and methodology

Title	Hours	ECTS	Learning outcomes
Theory classes (TE)	13	0.52	
Tutorials	7.5	0.3	
Laboratory practices (PLab)	6	0.24	
Case-resolution Work (PAul)	6	0.24	
Personal study	36.5	1.46	

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 Continuous and formative assessment	5

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.

Assessment

Continuous assessment activities

Title	Weight	Hours	ECTS	Learning outcomes
Human body function I Block - Practice: written evaluation through objective tests: multiple choice questions / restricted questions essay tests / problem solving	16%	1	0.04	CM01, CM02, KM01, KM02, KM04
Human body function I Block - Theory: evaluation through objective tests: multiple-choice questions	39%	2	0.08	CM01, CM02, KM01, KM02, KM04
Diagnostic Imaging Block - Theory: written evaluation through objective tests: multiple-choice questions	30%	2	0.08	CM01, CM02, KM01, KM02, KM04
Diagnostic Imaging Blog - Laboratory and classroom practices: Objective tests with multiple choice items: problem solving and reasoning skills	15%	1	0.04	CM01, CM02, KM01, KM02, KM04

The evaluation of the course will be based on the theoretical and practical syllabus detailed in the course guide.

The course is structured into two blocks: Diagnostic Imaging, which will account for 45% of the final grade, and Human Body Function I, which will account for 55%.

The competencies of this course will be assessed through:

Continuous evaluation:

Partial evaluations will be carried out throughout the course for the different sections of the syllabus.

The course is divided into two blocks:

1) Diagnostic Imaging (45% overall)

- Evaluation through a midterm examination consisting of an objective multiple-choice test evaluating the knowledge taught in theory classes and classroom and laboratory practical sessions (42% of the overall grade).

- Evaluation of attendance at laboratory practical sessions and submission of the practical questionnaire (3% of the overall grade).

A minimum mark of 5 must be obtained in the midterm examination in order to include the seminar and practical evaluation mark.

It is essential to obtain a grade of 4.5 or higher in the Diagnostic Imaging midterm examination in order to average it with the Human Body Function block.

2) Human Body Function I (55%)

Evaluation will consist of:

- Evaluation through a midterm examination covering diffusion and human physiology topics (47% of the overall grade), using an objective multiple-choice test on the theoretical and practical concepts of the syllabus.
- Evaluation of seminars and laboratory practical sessions in human physiology (8% of the overall course grade) through questionnaires on cases and problems addressed in seminars, classroom practicals, and laboratory sessions.

A grade of 5 or higher in the Human Body Function midterm examination is required to include the seminar and practical evaluation mark and to pass the course.

3) Overall grade

To pass the course, a minimum final grade of 5.0 is required.

- Final resit examination:

Students who have not passed the course through continuous evaluation may sit a final resit examination, in which they will only need to retake the midterm examinations that they failed during the continuous evaluation of the same academic year.

The resit examination will consist in all cases of objective multiple-choice tests for each block.

To pass the course, students must obtain a grade of 4.5 or higher in the Diagnostic Imaging examination and 5 or higher in the Human Body Function examination. The course grade will correspond to the weighted average: 45% from Diagnostic Imaging, 47% from Human Body Function, and 8% from the PAUL and PLAB grades in the Physiology component.

A minimum grade of 5 in the examinations is required to include the practical evaluation mark.

The course will be considered passed when the final grade is 5.0 or higher.

A grade of "not assessable" will be assigned when there is insufficient evidence to allow an overall evaluation of the course. To be assessed globally, results must be available for both blocks into which the course is divided (from the two midterm examinations and/or the final resit examination).

Single evaluation:

Students may opt for the single-evaluation system according to Faculty regulations. Single evaluation will consist of a comprehensive examination in two blocks:

1) Diagnostic Imaging (45% overall)

- It will consist of an objective multiple-choice test evaluating the knowledge taught in theory classes and classroom and laboratory practical sessions (45% of the overall grade).

2) Human Body Function I (55% overall)

- Objective multiple-choice test assessing theoretical knowledge of the subject (47% of the Physiology block grade).
- Objective multiple-choice test and/or restricted written questions on concepts related to laboratory practical

sessions and case studies from classroom practicals (8% of the overall grade).

To pass the course, students must obtain a grade of 4.5 or higher in the Diagnostic Imaging examination and 5 or higher in the Human Body Function examination.

To pass the course, a minimum overall grade of 5.0 is required.

The single-evaluation examination will be held on the date scheduled for the resit examination.

Resit examination: students who have not passed the course through single evaluation may sit a final resit examination. The date will be agreed upon with the teaching staff. The examination will have the same characteristics as the first session or may include written questions. The requirements to pass the course will be the same as in the first single-evaluation session.

A grade of "not assessable" will be assigned when there is insufficient evidence to allow an overall evaluation of the course. To be assessed globally, results must be available for both blocks into which the course is divided (from the single-evaluation examination and/or the resit examination).

In this course, the use of Artificial Intelligence (AI) technologies is permitted as an integral part of the work process, provided that the final result reflects a significant contribution by the student in analysis and personal reflection. Students must clearly identify which parts were generated using this technology, specify the tools used, and include a critical reflection on how these tools influenced both the process and the final outcome of the activity.

The commission of any irregularity in an assessment activity (academic misconduct, plagiarism, or improper use of AI, unless such use is expressly authorized in the course guide) that may lead to a significant alteration of the grade will result in that assessment activity being awarded a grade of 0. If the course guide establishes that obtaining a minimum grade in that assessment activity is an essential requirement to pass the course, or if multiple irregularities occur in the assessment activities of the same course, the final grade for the course will be 0. In addition, disciplinary proceedings may be initiated against any student who commits any of these irregularities.

Bibliography

- Biofísica. 3a ed. Madrid: Furmento AS. (1995) Mosby/Doyma Libros S.A.; 1995.
- Física para ciencias de la vida. Jou D, Llebot JE, Perez-Garcia C. (2009) 2a ed. Madrid: McGraw-Hill; 2009.
- Medical Physics. Physical Aspects of Organs and Imaging. H. Zabel (2017). De Gruyter Textbook.e-llibre: https://bibcercador.uab.cat/permalink/34CSUC_UAB/1eqfv2p/alma991010485419506709
- Handbook of Physics in Medicine and Biology, R. Splinter (2010). Boca Raton, CRC Press/Taylor & Francis Group.
e-llibre: https://bibcercador.uab.cat/permalink/34CSUC_UAB/1eqfv2p/alma991010483189506709
- Principios de anatomía y fisiología. Tortora GJ, Derrickson B. (2013), 13 ed. (també disponible en recurs electrònic, via biblioteca de la UAB)
- COSTANZO LS. Fisiología. Costanzo LS, (2018) 6a ed. Barcelona: Elsevier-Saunders (també disponible en recurs electrònic, via biblioteca de la UAB)

Software

No specific software is needed

Course groups and languages

The information provided is provisional until November 30. After this date, you will be able to consult the language of each group through this [link](#). To access the information, you will need to enter the course CODE

Type of teaching	Group	Language	Semester	Shift
(TE) Theory	101	Catalan/Spanish	first semester	morning-mixed
(PAUL) Classroom practices	101	Catalan/Spanish	first semester	morning-mixed
(PLAB) Practical laboratories	101	Catalan/Spanish	first semester	morning-mixed
(TE) Theory	102	Catalan/Spanish	first semester	morning-mixed
(PAUL) Classroom practices	102	Catalan/Spanish	first semester	morning-mixed
(PLAB) Practical laboratories	102	Catalan/Spanish	first semester	morning-mixed
(TE) Theory	103	Catalan/Spanish	first semester	afternoon
(PAUL) Classroom practices	103	Catalan/Spanish	first semester	morning-mixed
(PLAB) Practical laboratories	103	Catalan/Spanish	first semester	morning-mixed
(PAUL) Classroom practices	104	Catalan/Spanish	first semester	morning-mixed
(PLAB) Practical laboratories	104	Catalan/Spanish	first semester	morning-mixed
(PAUL) Classroom practices	105	Catalan/Spanish	first semester	afternoon
(PLAB) Practical laboratories	105	Catalan/Spanish	first semester	morning-mixed
(PAUL) Classroom practices	106	Catalan/Spanish	first semester	afternoon
(PLAB) Practical laboratories	106	Catalan/Spanish	first semester	morning-mixed
(PLAB) Practical laboratories	107	Catalan/Spanish	first semester	morning-mixed
(PLAB) Practical laboratories	108	Catalan/Spanish	first semester	morning-mixed
(PLAB)	109	Catalan/Spanish	first	afternoon

Practical laboratories			semester	
(PLAB) Practical laboratories	110	Catalan/Spanish	first semester	afternoon
(PLAB) Practical laboratories	111	Catalan/Spanish	first semester	afternoon
(PLAB) Practical laboratories	112	Catalan/Spanish	first semester	afternoon