Diagnostic Imaging and Function of the Human Body I

Code: 106097
ECTS Credits: 3

2024/2025

Degree	Type	Year
2500891 Nursing	FB	1

Contact

Name: Nuria Benseny Cases

Email: nuria.benseny@uab.cat

Teachers

Roser Velasco Fargas

Carolina Gutierrez Neira

Guillermo Garcia Alias

Natalia Lago Perez

Maria Isabel Marin Garcia

Nuria Benseny Cases

Teaching groups languages

You can view this information at the end of this document.

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 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.

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. PHYSICAL BASIS OF DIALYSIS AND OSMOSIS.

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

2. INTERACTION OF WAVES AND RADIATIONS WITH THE LIVING ORGANISM.

- 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)
- RADIOTHERAPY
- ECOGRAPHY

- 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

Activities and Methodology

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	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 Personal study	27,5
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

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Biophysics Block - Theory: written evaluation through objective tests: multiple-choice questions	38%	3	0.12	1, 2, 3, 5, 7, 8
Biophysics Blog - Laboratory and classroom practices: Objective tests with multiple choice items: problem solving and reasoning skills	28,66%	1	0.04	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

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 avaluation:

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)

- Exam of the Diffusion topic (30% of the grade for the Biophysics part, 20% of the subject's total).

- Exam of the part of Diagnosis by image (65% of the grade of the part of Biophysics, 43.3% of the overall subject).

The evaluation in the partial exams will consist of an objective test with multiple choice items, where the knowledge imparted in theory classes and in classroom and laboratory practices will be evaluated.

- Evaluation of the attendance at the laboratory practices and the handing in of the practice questionnaire: 5% of the grade for the Biophysics part -3.33% of the subject's overall grade.

It is necessary to obtain a minimum of 4.5 in the partial biophysics exams to be able to incorporate the practice evaluation grade.

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 weightedaverage, 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 (70% of the grade for the biophysics block).

Objective test with multiple-choice items to evaluate concepts relatedto laboratory practices and classroom practices (30% 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 third 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.

Bibliography

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Software

No specific software is needed

Language list

Name	Group	Language	Semester	Turn
(PAUL) Classroom practices	101	Catalan/Spanish	first semester	morning-mixed
(PAUL) Classroom practices	102	Catalan/Spanish	first semester	morning-mixed
(PAUL) Classroom practices	103	Catalan/Spanish	first semester	morning-mixed
(PAUL) Classroom practices	104	Catalan/Spanish	first semester	morning-mixed
(PAUL) Classroom practices	105	Catalan/Spanish	first semester	afternoon
(PAUL) Classroom practices	106	Catalan/Spanish	first semester	afternoon
(PLAB) Practical laboratories	101	Catalan/Spanish	first semester	morning-mixed
(PLAB) Practical laboratories	102	Catalan/Spanish	first semester	morning-mixed
(PLAB) Practical laboratories	103	Catalan/Spanish	first semester	morning-mixed
(PLAB) Practical laboratories	104	Catalan/Spanish	first semester	morning-mixed
(PLAB) Practical laboratories	105	Catalan/Spanish	first semester	morning-mixed
(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) Practical laboratories	109	Catalan/Spanish	first semester	afternoon
(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
(TE) Theory	101	Catalan	first semester	morning-mixed
(TE) Theory	102	Catalan	first semester	morning-mixed
(TE) Theory	103	Catalan	first semester	afternoon