

Teaching Guide of the subject

Year 2024 - 2025

DIAGNOSTIC IMAGING AND FUNCTION OF THE HUMAN BODY I

Code: 106097

ECTS credits: 3

Titulation	Type	Course	Semester
2500891 Nursing	FB	1	1

Contact	Use of languages
<p>Responsible:</p> <p>Vera Artázcoz, Paula pvera@santpau.cat</p> <p>Teaching staff:</p> <p>Vera Artázcoz, Paula pvera@santpau.cat</p> <p>Betbesé Roig, Antonio Jorge ajbetbese@santpau.cat</p>	<ul style="list-style-type: none"> Group 1: Catalan

Prerequisites

There are no official prerequisites, but it is recommended to have achieved the competencies of the subject Structure of the Human Body.

Contextualization and objectives

This subject is part of the Basic Sciences training module, subject Physiology and is planned in the first semester of the Bachelor's Degree in Nursing.

The human body is an entity that functions as a whole, in an organized and interrelated way. The proper functioning of the human body entails the physical and mental well-being of the person.

The purpose of this subject is to identify the balance and correct functioning of the body and all its systems in order to provide care based on a holistic nursing vision.

Learning objectives of the subject

1. Describe the chemical composition and the bases of metabolism that allow the proper functioning of the human body.
2. Describe the control systems that allow homeostatic balance.
3. Describe the main radiological techniques used for the diagnosis of diseases, as well as describe their physical bases.

Competencies and learning outcomes

Competence	Learning Outcomes
SPECIFIC	
<p>E01. To provide technical and professional health care appropriate to the health needs of the people being cared for, in accordance with the state of development of scientific knowledge at any given time and with the levels of quality and safety established in the applicable legal and deontological standards.</p>	<p>E01.27. Identify the physiological functioning of the human body and the homeostatic mechanisms that regulate it.</p> <p>E01.28. Describe the molecular and physiological basis of cells and tissues.</p> <p>E01.35. Identify the interactions of electromagnetic waves and radiation in humans.</p> <p>E01.36. Describe the safety measures before the application of radiation.</p> <p>E01.37. Identify the diagnostic imaging tests and examinations used in different pathophysiological alterations.</p>
GENERAL / BASIC	
<p>G01. To introduce changes in the methods and processes of the field of knowledge in order to provide innovative responses to the needs and demands of society.</p>	<p>G01.03. Acquire and use the necessary tools to develop a critical and reflective attitude.</p>
<p>G04. Act in the field of their own knowledge by evaluating inequalities based on sex/gender.</p>	<p>G04.03. To analyze differences by sex and gender inequalities in etiology, anatomy, physiology, pathologies, differential diagnosis, therapeutic options, pharmacological response, prognosis, and nursing care.</p>
<p>B01. Students must have demonstrated that they possess and understand knowledge in an area of study that is based on general secondary education, and is usually at a level that, although supported by advanced textbooks, also includes some aspects that involve knowledge from the forefront of their field of study.</p>	

Content

MODULE 1. Molecular function of the organism and bases of metabolism:

- BIOMOMOLECULES: Bioelements, biomolecules and macromolecules.
- WATER: Molecular structure and physical-chemical properties of water.
- PROTEINS: Properties of enzymes. General structure and properties of amino acids and proteins.
- CARBOHYDRATES: General properties, structure and classification.
- LIPIDS: General properties, structure and classification.
- ENZYME AND ENZYME KINETICS:
 - General Properties of Enzymes
 - Nomenclature and classification.
 - Enzymatic kinetics. Inhibition of enzyme activity.
 - Regulatory enzymes.
 - Vitamins and coenzymes.
- NUCLEOTIDE STRUCTURE:
 - Nucleotide structure and functions.
 - Nucleic acids, DNA, RNA.
- INTRODUCTION TO METABOLISM:
 - General concepts: Anabolism and catabolism. Energy aspects.
 - Role of the ATP. Basal metabolism.
 - Bioenergetics, oxidation and laws of thermodynamics.
 - Carbohydrate metabolism. Glycolysis. Via de las pentosas. Krebs cycle.
 - Oxidative phosphorylation. Gluconeogenesis. Metabolism of glycogens.
 - Lipid metabolism. Synthesis and degradation of triglycerides, fatty acids, phospholipids and cholesterol. Amino acid metabolism.
 - Synthesis and degradation of amino acids, urea cycle.
 - Nucleotide metabolism. Synthesis and degradation of ribonucleotides and deoxyribonucleotides.
 - Integration of metabolism in the liver, adipose tissue, skeletal muscle, heart and brain.
- HOMEOSTASIS:
 - Internal environment and homeostasis.
 - Body compartments.
 - Water balance. Body fluids.
 - Electrolyte balance. Distribution of electrolytes in the body.
 - Acid-base balance. Chemical bases of acids and bases.
 - Concept of pH.
 - pH regulation and control systems.

- **Module 2: Diagnostic Imaging**

- Introduction to Radiology:
 - Physics and properties of X-rays.
 - X-ray image.
 - Radiation interactions with the body.
- Security measures:
 - Effect of ionizing radiation on the cell cycle.
 - Biological effects of radiation.
 - Radiation dosimetry, dose limits and protection.
- Tests and Scans:
 - Computerized axial tomography.
 - Ultrasound – ultrasound.
 - Scintigraphy.
 - Positron emission tomography.
 - MRI.
 - Interventional radiology.

Methodology

The methodological approach of the subject is based on considering that the protagonist in the teaching and learning process is the student. Students must be active and autonomous throughout the process and teachers support them, providing the information and resources necessary for learning to take place.

Directed activity:

The subject is face-to-face with non-compulsory attendance. The theoretical class (TE) is used as a fundamental teaching methodology, developing active listening and exposition, and classroom practices (PAUL) with discussion and carrying out exercises and activities in groups or individually.

Supervised activity:

Different articles and documents are worked on. Tutorials can be face-to-face or electronic.

Training activities

Activity	Hours	ECTS	Learning Outcomes
Types: Directed . Theoretical classes (TE) . Classroom Internship (PAUL)	26,25	1,05	<i>E01.28, E01.35, E01.36, E01.37 B01, G01.03, G04.03</i>
Supervised Types . Guardianship	1	0,04	<i>E01.28, E01.35, E01.36, E01.37</i>
Type: Self-employed: . Personal study. . Bibliographic consultations and documents.	41,25	1,65	<i>E01.28, E01.35, E01.36, E01.37 B01, G01.03, G04.03</i>

The teaching staff will allocate approximately 15 minutes once the subject is finished to allow them to students can answer the assessment surveys on the teaching performance and the subject.

Evaluation

The student has only one call per academic year to pass the subject.

Academic progression and passing the subject is assessed through continuous and formative evaluation, through two multiple-choice tests of 40 questions and a written concept test that will be carried out at the same time as one of the two multiple-choice tests (due notice will be given). Each multiple-choice test will have a weight of 47.5%, while the proof of concept will have a weight of 5%.

In multiple-choice tests, the negative answers are according to the following formula:

NOTE = Hits - (errors/n-1), where n is the number of answer options. Its value will be between 0 and 10.

The proof of concept will be valued from 0 to 10.

The grade of the subject is given by the weighted average of the marks obtained in the two multiple-choice tests (from a 5 in each of them) and the concept test.

Requirements to be able to do the average:

1.- A minimum grade of 5 is required in each of the two multiple-choice assessments. The proof of concept score can be less than 5.

2.- The student must have taken a minimum of 66.6% of the total weight of the evaluation tests (this requires having taken the two multiple-choice evaluations).

The results of the evaluation tests will be retroacted through the classroom and tutorials where appropriate.

Qualification

- 0 to 4.9: Fail
- 5.0 to 6.9: Pass
- 7.0 to 8.9: Remarkable
- 9.0 to 10: Excellent (in the event that the student has obtained a grade equal to or higher than 9, he/she may opt, at the discretion of the teacher, for an honors).

Unique assessment

1. The date of the unique test will coincide with the date of the last continuous assessment test that appears in the daily schedule and in the calendar of training and evaluation activities.
2. The unique assessment will consist of:
 - Test 1 which will consist of a **multiple-choice** test and weights **47.5%**
 - Test 2 which will consist of a **multiple-choice** test and weights **47.5%**
 - Test 3 which will consist of a **Proof of Concepts** that will consist of and weights 5 %

Recovery activity

1. A unique date is determined for the remedial activity for all students, whether or not they are eligible for a unique evaluation
2. A remedial activity is proposed for those students who have been previously evaluated for the set of activities whose weight is equivalent to a minimum of 2/3 of the total grade of the subject, and have obtained a final grade higher than 3.5 and less than 5.
3. This test will consist of an evaluative activity depending on the part not passed. In other words, if the non-pass multiple-choice test is the first, it must be evaluated only for the same. In the event that it is the second, only the second must be evaluated. In the event that both have been suspended, both must be evaluated. There will be no proof of retake of the proof of concept. In the event that the student passes the retake test corresponding to the failed part (grade of 5 or higher), their grade for the test will be recorded as a 5. This grade will be the one that will average the other test (if it is approved) and the proof of concept, in order to obtain the final grade of the subject.
4. The retake tests will be determined by the teaching staff, usually multiple-choice tests, which will include all the contents of the failed part.
5. Once the subject has been passed, it cannot be subject to a new evaluation.

Not assessable

It is considered non-assessable when the student has not participated in any of the activities of the continuous assessment.

Exam Review

Once the final grade has been published, the student can request to carry out the review of the test within the established period. Requests for review outside of this period are not accepted.

Procedure in case of copying/plagiarism

1. Copying or plagiarism in any type of assessment activity is a crime, and will be penalised with a 0 as the grade of the subject, losing the possibility of recovering it, whether it is an individual or group work (in this case, all members of the group will have a 0).
2. If during the completion of an individual project in class, the teacher considers that a student is trying to copy or is discovered some type of document or device not authorised by the teaching staff, it will be graded with a 0, with no retake option, and therefore, the subject will be suspended.
3. A work, activity or exam is considered to be "copied" when it reproduces all or a significant part of the work of oneself or another classmate.
4. A work or activity will be considered "plagiarized" when a part of a text by an author is presented as one's own without citing the sources, regardless of whether the original sources are on paper or in digital format.

Aspects of assessment related to values and attitudes

1. The teacher may reduce the grade of the subject between 1 and 2 points out of 10 for any student who repeatedly does not respect the indications on the rules of behaviour in class.
2. "No disrespect for colleagues or teachers will be tolerated. Homophobic, sexist or racist attitudes will not be tolerated either. Any student in whom any of the attitudes described above are detected will be classified as failing the subject."

Other considerations

1. All the evaluation tests will be published in the daily program and in the calendar of the training and evaluation activities.
2. The date of the unique test will coincide with the date of the last continuous assessment test.
3. Students who repeat the subject may request at the beginning of the academic year to take only a final synthesis assessment (Article 117, page 46 of the Academic Regulations of the Universitat Autònoma de Barcelona (Approved by agreement of the Governing Council of 7 July 2022, and amended by agreement of the Governing Council of 1 February 2023).

Students in the second or higher enrolment who have taken all the assessment tests the previous year may choose to take assessment with a single synthesis assessment activity. This activity will consist of an exam at the end of the subject coinciding with the written exam of the subject. Students in the second or higher enrolment who wish to opt for the synthesis exam must notify the teaching staff responsible for the subject in writing two weeks before the published date.

Evaluation activities

Activity	Weight	Hours	ECTS	Learning Outcomes
- Multiple test 1	47,5%			
- Multiple-choice test 2	47,5%	7,5	0,28	<i>E01.28, E01.35, E01.36, E01.37, B01, G01.03, G04.03</i>
- Proof of concepts	5%			

Bibliography

STRUCTURE AND FUNCTION OF THE HUMAN BODY

Author: Escudero B, Sánchez J.M, Borrás J, Serrat J.

Edition: 2nd Edition. Mac GRAW Hill Interamericana de España 2002.

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Teaching platforms

- Moodle

