

Teaching Guide of the subject

Year 2026 - 2027

DIAGNOSTIC IMAGING AND HUMAN BODY FUNCTION I

Code: 106097

ECTS credits: 3

Qualification	Types	Course	Semester
2500891 Nursing	FB	1	1

Contact	Use of languages
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Prerequisites

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

Contextualisation and objectives

This subject is part of the Basic Sciences, Physiology subject training module 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 molecular and biochemical bases of cell metabolism that allow the proper functioning of the human body, as well as its relationship with the function of tissues and organs.
2. Explain the physiological and homeostatic mechanisms that regulate the functioning of the human body, as well as the control systems that allow internal balance to be maintained
3. Describe the main radiological techniques used to diagnose diseases, as well as describe their physical basis.

Learning Outcomes

Learning Outcomes of the DEGREE (RAT)	LEARNING OUTCOMES OF THE COURSE (RAM)
KT02. Describe the structure and functioning of the human body, the physiological and biochemical foundations, and the pathophysiological processes across the different stages of the life cycle.	KM01. Define the structure and function of the human body (KT02). KM02. Identify the molecular and physiological bases of cells and tissues (KT02). KM04. Recognize the physical principles underlying diagnostic imaging (KT02).
CT01. Apply comprehensive and continuous nursing care in health and social care settings, ensuring the health and well-being of individuals, families, and communities. Such care must be grounded in available scientific evidence, clinical practice guidelines, and current legislation to guarantee well-being, quality, and safety.	CM01. Perform physical examinations by body systems (CT01). CM02. Apply the appropriate healthcare technologies to each clinical case or health situation (CT01).

Contents

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

- BIOMOLECULES: Bioelements, biomolecules and macromolecules.
- WATER: Molecular structure and physicochemical properties of water.
- PROTEINS: Properties of enzymes. Structure and general properties of amino acids and proteins.
- CARBOHYDRATES: General properties, structure and classification.
- LIPIDS: General properties, structure and classification.
- ENZYME AND ENZYMATIC KINETICS:
 - General properties of enzymes
 - Nomenclature and classification.
 - Enzymatic kinetics. Inhibition of enzymatic activity.
 - Regulatory enzymes.
 - Vitamins and coenzymes.
- NUCLEOTIDE STRUCTURE:
 - Nucleotide structure and functions.
 - Nucleic acids DNA, RNA.
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- 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 les pentoses. Krebs cycle.
 - Oxidative phosphorylation. Gluconeogenesis. Glycogen metabolism.
 - Lipid metabolism. Synthesis and degradation of triglycerides, fatty acids, phospholipids and cholesterol. Amino acid metabolism.

- Synthesis and degradation of amino acids, urea cycle.
 - Metabolism of Nucleotides. Synthesis and degradation of ribonucleotides and deoxyribonucleotides.
 - Integration of metabolism in the liver, adipose tissue, skeletal muscle, heart and brain.
- HOMEOSTASI:
 - 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.
 - Interactions of radiation with the body.
- Security measures:
 - Effect of ionizing radiation on the cell cycle.
 - Biological effects produced by radiation.
 - Radiation dosimetry, dose limits and protection.
- Tests and explorations:
 - Computed axial tomography.
 - Ultrasons – ultrasound.
 - Gammagraphy.
 - Positron emission tomography.
 - Magnetic resonance imaging.
 - 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 necessary information and resources 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, expositive, participatory and group, developing active listening and exposition, and classroom practices (PAUL) with discussion and performance of exercises and activities in groups or individually.

Supervised activity:

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

Training activities¹

Activity	Hours	ECTS	Learning Outcomes
Type: Directed . Theoretical classes (TE) . Classroom Practices (PAUL)	26,25	1,05	KM01,KM02,KM04,CM01,CM02
Supervised Types . Tutoring	1	0,04	KM01,KM02,KM04,CM01,CM02
Type: Self-employed: . Personal study. . Bibliographic queries and documents.	41,2 5	1,65	KM01,KM02,KM04,CM01,CM02

Evaluation

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

Academic progression and passing the subject is assessed through a continuous and formative assessment, through two multiple-choice tests and a written concept test that will be carried out at the same time as one of the two multiple-choice tests (duly notified). 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 = Correct answers - (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 grades 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 evaluations. The proof of concept grade may be less than 5.

¹ The teaching staff will allocate approximately 15 minutes once the subject is finished to allow that their students can answer the assessment surveys on teaching and subject.

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).

Feedback on the results of the evaluation tests will be made through the classroom and tutorials if necessary.

Qualification

- 0 to 4.9: Suspense
- 5.0 to 6.9: Passed
- 7.0 a 8.9: Notable
- 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 degree).

Single assessment

1. The date of the single test will coincide with the date of the last continuous assessment test that appears in the daily programme and in the calendar of training and assessment activities.
2. The single 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 single date is determined for the recovery activity for all students, whether or not they are subject to single assessment
2. A recovery 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 evaluation activity depending on the part not passed. That is, if the multiple-choice test not passed is the first, it will only have to be evaluated. In the event that it is the second, only the second must be evaluated. In the event that both have been failed, both must be evaluated. There will be no proof-of-concept retake test. In the event that the student passes the retake test corresponding to the failed part (grade of 5 or more), their grade for the test will be recorded as a 5. This grade will be the one that averages the other test (if passed) and the concept test, 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.

No evaluable

It is considered that the subject will not be assessable when one of these circumstances is met:

1. Not having delivered any of the continuous assessment activities provided for in the teaching guide.
2. Not having attended any of the practical or compulsory sessions, when these are necessary to assess learning outcomes and as indicated in the teaching guide.
3. Not having taken the final test (exam, written or oral test, work defense, etc.), if This represents an essential percentage of the grade.
4. Not having completed the minimum required participation in training activities (for example, seminars, presentations, forums, etc.), when these are part of the evaluation.
5. Not having submitted the final project or compulsory project, if this constitutes a central evidence of learning of the subject.

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. Review requests outside of this period are not accepted.

Procedure in case of copying / plagiarism

1. Copying **or plagiarism** in any type of evaluation activity constitutes a crime, and will be penalized with a 0 as a grade for 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 assignment in class, the teacher considers that a student is trying to copy or is discovered some type of document or device not authorized by the teacher, the same will be graded with a 0, without the option of recovery, and therefore, the subject will be suspended.
3. A work, activity or exam will be considered to be "copied" when it reproduces all or a significant part of the work of oneself, 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 in paper or digital format.

The use of Artificial Intelligence (AI) technologies

The use of Artificial Intelligence (AI) technologies is regulated according to the type of work to be carried out:

1. In the event that the work aims at personal reflection and meaningful learning by the student, **the use of AI technologies is prohibited** in any of its phases of completion. Any work that includes AI-

generated fragments (e.g. abstracts, translations, text writing or image creation) will be considered a lack of academic honesty and may lead to a partial or total penalty in the grade of the activity, as well as greater penalties in cases of seriousness.

2. In other works, **the restricted use of AI technologies is allowed** exclusively in those support tasks, such as bibliographic or information searches, proofreading, translations, and other specific situations that are indicated. In these cases, the student will have to clearly identify which parts have been generated with this technology, specify the tools used and include a critical reflection on how they have influenced the process and the final result of the activity. The non-transparency of the use of AI in this assessable activity will be considered a lack of academic honesty and may lead to a partial or total penalty in the grade of the activity, as well as greater sanctions in cases of severity.

In any case, in the description of each assignment, the teacher in charge will clearly indicate **whether the prohibited or restricted use of AI applies**.

Aspects of evaluation related to values and attitudes

1. The teacher may reduce the grade of the subject between 1 and 2 points out of 10 for those students who repeatedly do not respect the indications on the rules of behavior in class.
2. "No lack of respect for classmates or teachers will be tolerated. Homophobic, sexist or racist attitudes will also not be tolerated. Any student in whom any of the attitudes described above are detected will be classified as having failed the subject."

Other considerations

1. All the evaluation tests will be published in the daily program and in the calendar of training and evaluation activities.
2. The date of the single 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 course to carry out only one 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 modified by agreement of the Governing Council of 1 February 2023).

Students in second or more enrolment who have taken all the assessment tests in the previous year may opt to be assessed 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 second or more enrolment who wish to opt for the final 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-choice test 1	47,5%	7,5	0,28	KM01,KM02,KM04,CM01,CM02
- Test type 2	47,5%			
- 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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To the program

- Moodle