

**“Imaging Diagnosis and Function of the Human Body I****2020/2021**

Code: 106097

Credits ECTS: 3

Degree	School Plan	Type	Course	Semester
1471 Nursing	Nursing Degree	Basic Training	1	1

**Contact:****Responsible for the Subject:**

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[PVera@santpau.cat](mailto:PVera@santpau.cat)**Use of languages:**

Principal working language: Catalan.

Some groups entirely in English: No.

Some groups entirely in Catalan: Yes

Some groups entirely in Spanish: No

**Prerequisites**

There are no official prerequisites; it is recommended that students have successfully completed the competences of the subject Human Body Structure.

**Contextualization and objectives**

This subject is part of the Basic Sciences training module of the degree in Nursing, Physiology subject is planned in the first semester.

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

The purpose of this course 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 correct 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 describing their physical bases.

**Competence and learning outcomes**

Competences	Learning outcomes
E01. To provide technical and professional health care appropriate to the health needs of the people it serves, 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>E01.27 Know the chemical composition of the human body and the bases of metabolism.</p> <p>E01.28 Describe the molecular and physiological bases of cells and tissues.</p> <p>E01.35 To identify the interactions of electromagnetic waves and radiation in the human being.</p> <p>E01.36 Describing safety measures in the application of radiation.</p> <p>E01.37 Identify diagnostic imaging tests and examinations used in various path physiological disorders.</p>
Basics / Generals	
B01 Students have demonstrated knowledge and understanding in an area of study that is at the core of general secondary education, and is often at a level that, while supported by advanced textbooks, also includes some aspects involving knowledge from the cutting edge of their field of study.	
G01 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.	G1.03 Acquire and use the tools necessary to develop a critical and reflective attitude.
G04 To act in the area of own knowledge by assessing gender/gender inequalities.	G04.03 Analyze sex differences and gender inequalities in etiology, anatomy, physiology, pathology, differential diagnosis, therapeutic options, pharmacological response, prognosis, and nursing care.

## 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 the amino acids and proteins.

CARBON HYDRATES: General properties, structure and classification.

LIPIDS: General properties, structure and classification.

ENZYMES and enzymatic kinetics.

- . General properties of enzymes.
- . Nomenclature and classification.
- . Enzyme kinetics. Inhibition of enzymatic 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 ATP. Basal metabolism.
- . Bioenergetics, oxidation and laws of thermodynamics.
- . Carbohydrate metabolism. Glycolysis. Pentose's route. Krebs cycle.
- . Oxidative phosphorylation. Gluconeogenesis. Glycogen metabolism.
- . Lipid metabolism. Synthesis and degradation of triglycerides, acids fat, phospholipids and cholesterol. Amino acid metabolism.
- . Synthesis and degradation of amino acids, urea cycle.
- . Metabolism of the nucleotides. Synthesis and degradation of nucleotides and deoxyribonucleotides.
- . Integration of the metabolism in the liver, adipose tissue, muscle skeletal, cardiac 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    Imaging diagnostics**

1. Introduction to radiology:
  - a. Physics and properties of X-rays.
  - b. Radiographic imaging.
  - c. Interactions of radiation with the organism.
2. Safety measures:
  - a. Effect of ionizing radiation on the cell cycle.
  - b. Biological effects produced by radiation.
  - c. Radiation dosimetry, dose limits and protection
3. Tests and examinations:
  - a. Computerized axial tomography.
  - b. Ultrasound - sonography.
  - c. Gammagraphy.
  - d. Positron emission tomography.
  - e. Magnetic resonance imaging.
  - f. Interventional Radiology.

### **Methodology**

The methodological approach of the subject places the student at the centre of the teaching-learning process. The student has to be active and autonomous throughout the learning process, while the teacher provides with the necessary information and resources for the learning

#### ***Directed activity:***

The subject is face-to-face with non-compulsory attendance. The group lectures are student participatory are used as a teaching methodology to develop active listening and exposition. Classroom practices include discussion and conduct of group or individual exercises and activities.

#### ***Supervised activity:***

The student will work with different articles and documents. Tutorials can be face-to-face or on-line.

## Activities

Activity	Hours	ECTS	Learning Outcomes
<b>Type: Directed:</b> . Theory . Classroom practices	26,25	1,05	E01.28, E01.35, E01.36,E01.37 B01,G01.03,G04.03
<b>Type: Supervised:</b> . Tutorials	1	0,04	
<b>Type: Autonomous:</b> . Bibliographic consultation	41,25	1,65	

## Assessment

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

Academic progression and passing the subject is assessed by means of a continuous and formative evaluation, through two 40-question multiple-choice tests and a written concept test that will be done at the same time as the second continuous evaluation. Each multiple-choice test will have a weight of 47.5%, while the concept test will have a weight of 5%.

In multiple choice tests, points are deducted for incorrect answer according to the following formula:  $NOTE = successes - (errors/n-1)$ , where  $n$  is the number of answer choices. Its value will be between 0 and 10.

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

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

Requirements for the weighted average:

1. - A minimum of 5 is required in both test evaluations to pass the subject overall.
2. - The student must have presented at a minimum of 66.6% of the total weight assessment tests (this requires that the student submits both test evaluations).

## Recovery Activity

A second change activity is proposed to students who have been previously evaluated by a set of activities whose minimum weight is equivalent to 2/3 of the total grade of the subject and who have obtained a final grade greater than 3.5 and less than 5 out of 10.

This test will consist of a single assessment activity, to be determined by the teacher, usually a test, which will include all the contents of the subject, and which will be carried out in the period established for this purpose. The result of this test will allow access to a 5 as a final grade of the course.

Once the course has been passed, it cannot be re-evaluated.

### Non-evaluable:

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

### Qualification:

- 0 to 4, 9: Fail
- 5, 0 to 6, 9: Basic 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 greater than 9 may, at the discretion of the teacher, be eligible for an honorary degree).

### Final grade review:

Once the final grade is published, the student may request a review of the evaluation test within the period determined for this purpose. Requests for review are not accepted on dates outside the established limit.

### Behaviour Rules

The teacher may downgrade between 1 and 2 points out of 10 to a student who repeatedly does not respect the indications on standards of class behaviour.

### Assessment Activities

Activity	Weight	Hours	ECTS	Learning Outcomes
Test type 1	47,5%	7,50	0,28	E01.28, E01.35, E01.36, E01.37, B01, G01.03, G04.03
Test type 2	47.5%			
Proof of concepts	5%			

## **BIBLIOGRAPHY**

### **ESTRUCTURA Y FUNCIÓN DEL CUERPO HUMANO**

Author ESCUREDO B, SANCHEZ J.M, BORRAS J, SERRAT J.  
Edition 2ª edición. Mac Graw Hill Interamericana de España 2002  
ISBN 9788448604684

### **Sobotta. Atlas de anatomía humana**

Author Friedrich Paulsen and Jens Waschke  
Edition 24ª edición. Friedrich Paulsen and Jens Waschke eds. 2019  
ISBN 9788491133667

### **FISIOLOGÍA HUMANA**

Author Silverthorn, Ober, Garrison, Silverthorn, Johnson  
Edition Editorial Médica Panamericana, 2008  
ISBN 978950061980

### **NETTER FUNDAMENTOS DE FISIOLOGÍA**

Author Mulroney, SE.  
Edition Editorial Elsevier España 2011  
ISBN 9788445802007