



Universitat de Lleida

# DEGREE CURRICULUM **PHYSIOLOGY**

Coordination: PRAT COROMINAS, JOAN

Academic year 2021-22

## Subject's general information

<b>Subject name</b>	PHYSIOLOGY			
<b>Code</b>	100604			
<b>Semester</b>	2nd Q(SEMESTER) CONTINUED EVALUATION			
<b>Typology</b>	<b>Degree</b>	<b>Course</b>	<b>Character</b>	<b>Modality</b>
	Bachelor's Degree in Human Nutrition and Dietetics	1	COMMON	Attendance-based
<b>Course number of credits (ECTS)</b>	9			
<b>Type of activity, credits, and groups</b>	<b>Activity type</b>	PRALAB	PRAULA	TEORIA
	<b>Number of credits</b>	1.5	3	4.5
	<b>Number of groups</b>	3	2	1
<b>Coordination</b>	PRAT COROMINAS, JOAN			
<b>Department</b>	EXPERIMENTAL MEDICINE			
<b>Teaching load distribution between lectures and independent student work</b>	H Presencials 90 Magistral 45 Pràctica 15 Seminari/Treball 30  H. No Presecials 135			
<b>Important information on data processing</b>	Consult <a href="#">this link</a> for more information.			
<b>Language</b>	Anglès Catellà Català			
<b>Distribution of credits</b>	Clases magistrals 4.5 crèdits Seminaris: 3.0 crèdits Pràctiques: 1.5 crèdits			

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
PRAT COROMINAS, JOAN	joan.prat@udl.cat	10,5	
SERRANO CASASOLA, JOSÉ CARLOS ENRIQUE	josecarlos.serrano@udl.cat	3	
TORRES CABESTANY, PASCUAL	pascual.torres@udl.cat	1,5	

## Subject's extra information

Physiology is a basic subject in all health related degrees according to Royal Decree 1393/2007 of October 29 on the management of Official University Studies. In the formation of graduates in Nutrition it is a fundamental matter due to the implication of physiological knowledge in compressing the functioning of the human body and the bases of the disease.

Physiology defines the characteristics of human beings in health and provides a basis for studying the deviations from this towards the disease. In this context, the teaching of Physiology has a general objective to provide the knowledge of body functions and the acquisition of the methodology for the study and development of attitudes toward health maintenance and treatment of the disease.

The contributions of the Physiology course to the acquirement of skills are: 1 / to provide sufficient knowledge to understand and describe the functions of systems of the healthy organism at different levels of organization and integration processes leading to homeostasis. All as a basis for further understanding the pathophysiology and etiology of disease's mechanisms, therapeutic bases for maintaining a good health status and the prevention of diseases; 2 / to provide appropriate mechanisms to understand and describe the basic methods of functional exploration of the different systems and organs 3 / to facilitate the acquisition of skills needed to perform certain functional explorations and laboratory techniques.

Its main objective is that the students could recognize and know how the structure (histology and anatomy) and function (physiology) of the human body works. This knowledge will enable them to understand and interpret the most advanced physiology and the basis of human pathology. In addition the student will also acquire skills that are fundamental terminology to understand cellular pathology and pathology aspects in other courses.

At the instrumental level, students will become familiar with the techniques and equipment used to study the function of the organs and systems of the human body. In addition, to facilitate the achievement of the theoretical and practical objectives, this course will be used as educational resources seminars and physiology laboratory practices.

## Learning objectives

Key skills to contributing

The physiology will encourage and promote the acquisition of the following skills

- Learn how scientific knowledge is generated
- Learn and use the scientific method
- Develop a capacity for critical reasoning

- Develop the ability to interpret the results in simple experimental designs.
- Use the information to rationally solve problems at any time.
- Acquire skills for bibliographic reference
- Acquire the capacity for synthesis to give clear and concise information obtained about a topic.
- Being able to develop teamwork.
- Acquire skills to learn independently and continuously.
- Learn the basics of the disease and more prevalent human diseases.
- Acquire knowledge of animal biology needed to perform experiments on animals.

#### Learning objectives

##### *At a knowledge level*

- Understand and use physiological terminology
- Demonstrate an understanding of the specific components of the human body at a functional level.
- Understand the physiological knowledge of the different structures of the human body.
- Assimilate the concept of functional unit of the human body and the nature and mechanisms of control and integration systems that make it possible.
- Understanding the different physiological mechanisms that contribute to maintaining the homeostasis of the human body
- Analyze the functioning of the different organs and systems and control mechanisms.
- Integrate the functioning of the body and relate the activity of the different organs and systems.
- Recognize the normal physiological as a starting point for assessing the needs of the human body and the relation of this normality with the disease.
- Know the terminology and basic scientific language related to physiology.

##### *In terms of capabilities and applications*

- Understand the basic physiology of the body and know how to integrate this knowledge with morphological knowledge.
- Integrate and apply the concepts learned about the normal structure and physiology of the body to understand and interpret the most advanced human physiology and pathology.

##### *In terms of values and attitudes*

- Understanding the need of a basic physiological knowledge for the professional development in the future in the field of health sciences.
- Understand how scientific knowledge is generated, and the use the scientific method.

## Competences

### **Competencies segons el Pla de Estudis del Grau de Nutrició Humana i Dietètica.**

1 Conèixer l'estructura i funció dels cos humà, des del nivell molecular a l'organisme complet, en les diferents etapes de la vida.

7. Conèixer les bases i fonaments de l'alimentació i la nutrició humana

## Subject contents

### **Topic 1. Cellular Physiology**

- Principles of cell function
- Homeostasis of body fluids,
- Signal transduction, membrane receptors, second messengers and regulation of gene expression.

**Topic 2. Nervous System**

- Generation and conduction of action potentials
- Synaptic transmission
- The somatosensory system
- Special senses
- Organization of motor function
- Higher functions of the nervous system
- The autonomic nervous system and central control

**Topic 3. Skeletal-Muscular system**

- Skeletal muscle physiology
- Smooth muscle
- Bone physiology

**Topic 4. Cardiovascular System**

- Introduction to circulation
- Elements of cardiac function
- Properties of blood vessels
- Regulation of the heart and vessels
- Integrated control of the cardiovascular system

**Topic 5. Respiratory System**

- Structure and function of the respiratory system
- Mechanical properties of the lung and torax: static and dynamic
- Ventilation and perfusion ratio ventilation/perfusion
- Transport of oxygen and carbon dioxide
- Breath control
- No respiratory lung functions

**Topic 6. Renal System**

- Renal function elements
- Water and solute transport along the nephron: tubular function
- Control of osmolarity and volume of body fluid
- Potassium homeostasis, calcium and phosphorus

**Topic 7. Body fluids and blood**

- Body fluids and plasma
- Erythrocytes and blood groups
- Leukocytes and immunity
- Hemostasis

**Topic 8. Digestive System**

- Functional anatomy and general principles of regulation in the gastrointestinal tract
- Cephalic, oral and esophageal phase and integrated response to food
- Small intestine phase and the integrated response to food
- Colonic phase and integrated response to food
- Metabolic liver functions.
- Basic principles of nutrition and metabolism
- Satiety peptides

**Topic 9. Endocrine System**

- Introduction to endocrine system
- Hormonal regulation of energy metabolism

- Hormonal regulation of calcium and phosphorus metabolism
- The hypothalamus and pituitary gland
- The thyroid gland
- The adrenal gland
- Adipose tissue as an endocrine system
- Chronobiology

## Methodology

Tasks to be undertaken during learning

To achieve the objectives and to help the acquirement of the described skills the following activities are scheduled:

Lectures (CM): these will be conducted with all students. They are intended to give an overview of the thematic content highlighting those aspects that will be useful in their training.

Seminars (Sem): to be made with 1/2 of the students, the assistance is obligatory. The seminars aim students to apply theoretical concepts and to deepen the most important and most complex aspects of the issues.

Laboratory practice (PL) these will be made with 1/2 of students, the assistance is obligatory. They aim to expand students' knowledge acquired in class physiology and the introduction of new topics in physiology that are not given in lecture activities.

## Evaluation

Evaluation		
		Type of evaluation
<b>Theory</b>	75%	3 written evaluations.
<b>Laboratory practices</b>	5%	Questionnaires and laboratory reports
<b>Seminars</b>	10%	Literature review, discussion, etc.
<b>Short-test</b>	10%	On-line short test at each topic

## Bibliography

### On-line resources from the Library of the University of Lleida

<http://biblioguies.udl.cat/c.php?g=381764&p=2586597>

### Other recommended books

- Costanzo LS. Fisiologia. 4ta. Ed. Editorial Elsevier.Barcelona, ??Espanya. 2011.
- Córdova A. Fisiologia Dinàmica. Editorial Masson. Barcelona, ??Espanya. 2003.

- Guyton AC, Hall JE. Tractat de fisiologia mèdica. 12<sup>a</sup>. Ed. Editorial Elsevier, Barcelona, Espanya 2011.
- Pocock G, Richards CD. Fisiologia Humana. La Base de la Medicina. Editorial Masson, Barcelona, Espanya. 2002
- Tortora GJ, Derrickson B. Introducció al cos humà. Fonaments d'Anatomia i Fisiologia. Editorial Mèdica Panamericana, Madrid, Espanya. 2008.

**Links of interest**

[www.freemedicaljournals.com](http://www.freemedicaljournals.com)

[www.scopus.com](http://www.scopus.com)

[www.ncbi.nlm.nih.gov](http://www.ncbi.nlm.nih.gov)

[www.nutricion.org](http://www.nutricion.org)

[www.seennutricion.org](http://www.seennutricion.org)

[www.nal.usda.gov/fnic](http://www.nal.usda.gov/fnic)

**Revistes**

Journal of Nutrition

European Journal of Nutrition

American Journal of Clinical Nutrition

Obesity

Molecular Nutrition and Food Research

Endocrinologia i Nutrició

Food Science and Nutrition

International Journal of Food Science and Nutrition

Journal of Food Science

Journal of Food Protection

Nutrition Reviews