



Information about the subject

Degree: Bachelor of Science Degree in Human Nutrition and Dietetics

Faculty: Faculty of Medicine and Health Sciences

Code: 1311104 **Name:** Biology and Genetics

Credits: 6,00 **ECTS Year:** 1 **Semester:** 1

Module: Basic Science Module

Subject Matter: Biology **Type:** Basic Formation

Field of knowledge: Health Sciences

Department: Pathology

Type of learning: Classroom-based learning

Languages in which it is taught: Spanish

Lecturer/-s:

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Module organization

Basic Science Module

Subject Matter	ECTS	Subject	ECTS	Year/semester
Biology	6,00	Biology and Genetics	6,00	1/1
Biochemistry	6,00	Biochemistry	6,00	1/2
Chemistry	12,00	Basic Fundamentals of Chemistry	6,00	1/1
		Organic Chemistry	6,00	1/2
Physiology	12,00	Physiology	6,00	1/2
		Physiology II	6,00	2/1
Statistics	6,00	Biostatistics	6,00	1/1
Human Anatomy	6,00	Human Anatomy	6,00	1/1
Psychology	6,00	Psychology	6,00	2/1
Anthropology	12,00	Anthropology	6,00	1/1
		Food and Culture	6,00	4/1

Recommended knowledge



PREVIOUS REQUIREMENTS:

It has not established.

GENERAL OBJECTIVES:

The general objective of this course is that the student knows the biological and genetic foundations with application in human nutrition and dietetics. Biology is the science that studies the origin, evolution and properties of living beings, while genetics is the branch of biology that studies the biological inheritance that is transmitted from generation to generation. The student will study the structural and molecular aspects of the cellular base of organisms. They will get an overview of the cell and its functions within the body. In addition, they will be introduced to human genetics, the basic principles of genome organization, and heredity from a nutrigenetics perspective. The objective will be for the student to know that genetic variants can affect the biological response to different nutrients, modulating the predisposition to suffer from complex diseases.

Learning outcomes

At the end of the course, the student must be able to prove that he/she has acquired the following learning outcomes:

- R1 Understanding and assimilation of the concepts included in the course content.
- R2 Ability to solve problems related to these contents using different resources.
- R3 Ability to work in a laboratory performing correctly the basic operations and observing the corresponding security rules. As well as a correct understanding of the planning, development and purpose of the experience.
- R4 Understanding and proper use of language, as well as correct writing and presentation of data.



Competencies

Depending on the learning outcomes, the competencies to which the subject contributes are (please score from 1 to 4, being 4 the highest score):

BASIC		Weighting			
		1	2	3	4
CB1	Students demonstrate 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 that involve knowledge from the cutting edge of their field of study.			X	
CB2	Students know how to apply their knowledge to their work or vocation in a professional way and possess the skills that are usually demonstrated through the elaboration and defense of arguments and the resolution of problems within their area of study.			X	
CB5	Students develop those learning skills necessary to undertake further studies with a high degree of autonomy.			X	

GENERAL		Weighting			
		1	2	3	4
CG01	Students recognize the essential elements of the dietitian-nutritionist profession, including ethical principles, legal responsibilities and the exercise of the profession, applying the principle of social justice to professional practice and developing it with respect for individuals, their habits, beliefs and cultures.			X	

SPECIFIC		Weighting			
		1	2	3	4
CE01	Students know the chemical, biochemical and biological fundamentals of application in human nutrition and dietetics.				X



Assessment system for the acquisition of competencies and grading system

Assessed learning outcomes	Granted percentage	Assessment method
	5,00%	Evaluation of the use of the practical classes in the classroom, of problems or computers, seminars and tutorials. Through attendance, and participation in the different activities proposed.
	60,00%	Written evaluation of the knowledge and skills obtained. The test may consist of a series of open-ended or multiple-choice questions on the theoretical content of the subject and/or practical exercises (problem solving).
	20,00%	Assessment of practical laboratory work, or laboratory culinary techniques workshop, through which the competencies acquired must be demonstrated and that they are capable of being used to solve the different situations and problems that arise in a laboratory; this assessment may be carried out by one of the following methods, or a combination of several of them: an individual written test, the individual or group performance of a laboratory experience, the submission of an individual or group report on the work carried out in the laboratory
	15,00%	Evaluation of individual or group practices or activities, in which information related to each of the subjects must be sought and structured, and cases or problems resolved. This is done through a system of continuous evaluation throughout the course, which involves the delivery and / or exposure of work, whose objectives and content will be proposed by the teacher.

Observations

A minimum grade of 5 is needed in the individual written test (the theoretical part and the practical part) to be able to average. Attendance to laboratory practices is mandatory.



MENTION OF DISTINCTION:

In accordance with the regulations governing the assessment and grading of subjects in force at UCV, the distinction of "Matrícula de Honor" (Honours with Distinction) may be awarded to students who have achieved a grade of 9.0 or higher. The number of "Matrículas de Honor" (Honours with Distinction) may not exceed five percent of the students enrolled in the group for the corresponding academic year, unless the number of enrolled students is fewer than 20, in which case a single "Matrícula de Honor" (Honours with Distinction) may be awarded. Exceptionally, these distinctions may be assigned globally across different groups of the same subject. Nevertheless, the total number of distinctions awarded will be the same as if they were assigned by group, but they may be distributed among all students based on a common criterion, regardless of the group to which they belong. The criteria for awarding "Matrícula de Honor" (Honours with Distinction) will be determined according to the guidelines stipulated by the professor responsible for the course, as detailed in the "Observations" section of the evaluation system in the course guide.

Learning activities

The following methodologies will be used so that the students can achieve the learning outcomes of the subject:

- M1 Exposition of contents by the teacher, analysis of competencies, explanation and demonstration of capacities, skills and knowledge in the classroom. The blackboard, the computer and the cannon will be used to display texts, graphics, etc.
- M2 Resolution of practical exercises and case studies, analysis of evaluation procedures and procedural intervention. All this with the support of the teacher. This aspect can be controlled through attendance and active participation in the practical sessions.
- M3 Resolution of practical exercises and case studies, analysis of evaluation procedures and procedural intervention. All this with the support of the teacher. This aspect can be controlled through attendance and active participation in the practical sessions.
- M5 Student study: individual preparation of readings, essays, problem solving, seminars, papers, reports, etc. for discussion or delivery in electronic format.
- M6 Application and sharing of multidisciplinary knowledge This is the resolution of a problem that in its subsequent professional practice would require the application of skills acquired through the development of the modules and that would produce synergies in the assimilation of transversal and specific skills. Group work competences will be specifically evaluated.



- M7 Personalised attention and in small groups. Period of instruction and/or orientation carried out by a tutor with the aim of reviewing and discussing the materials and topics presented in the classes, seminars, readings, completion of assignments, etc. The attendance of the student and his/her level of gradual development in the knowledge of the subjects will be evaluated.
- M8 A set of tests, written or oral, used in the evaluation of the student.
- M9 Group preparation of readings, essays, problem solving, seminars, papers, reports, etc... for discussion or delivery.



IN-CLASS LEARNING ACTIVITIES

	LEARNING OUTCOMES	HOURS	ECTS
Theoretical lessons M1	R1, R2, R4	30,00	1,20
Practice lessons M2	R3, R4	5,00	0,20
Laboratory M3	R3, R4	15,00	0,60
Group work presentation M6	R3, R4	6,00	0,24
Office Hours M7	R1, R2, R4	2,00	0,08
Evaluation M8	R1, R2, R3, R4	2,00	0,08
TOTAL		60,00	2,40

LEARNING ACTIVITIES OF AUTONOMOUS WORK

	LEARNING OUTCOMES	HOURS	ECTS
Autonomous work M5	R1, R2, R4	70,00	2,80
Group work M9	R2, R3	20,00	0,80
TOTAL		90,00	3,60



Description of the contents

Description of the necessary contents to acquire the learning outcomes.

Theoretical contents:

Content block	Contents
UNIT I: INTRODUCTION TO CELL BIOLOGY	Topic 1- Introduction: origin and evolution of cells. The cell theory. Prokaryotic and eukaryotic cells. Animal and plant cells. Composition of the cell.
UNIT II: THE PLASMA MEMBRANE AND THE ENDOMEMBRANE SYSTEM	Topic 2- Structure and function of the membrane. Topic 3- Permeability and Transport through the membrane. Topic 4- Endoplasmic reticulum. Golgi apparatus. Mitochondria. Lysosomes and Peroxisomes. Vacuoles. Vesicular transport. Topic 5- Endocytosis and exocytosis.
UNIT III: CELLULAR COMMUNICATION	Topic 6- Cell signaling: types. Cellular receptors.
UNIT IV: CYTOSKELETON	Topic 7- Structure and functions of the cytoskeleton: microtubules, microfilaments and intermediate filaments. Cellular mobility.
UNIT V: THE CORE	Topic 8- Core components. The text of DNA. Packaging of DNA in chromosomes. Ribosomes.
UNIT VI: THE CELL CYCLE	Topic 9- The cell cycle, cell division: mitosis and meiosis
UNIT VII: GENETICS	Topic 10- Fundamentals of genetics. The inheritance of genetic material. Topic 11- Chromosomal alterations. Topic 12- Genetic bases of metabolic pathologies.
UNIT VIII: NUTRIGENETICS	Topic 13. Nutrigenetics and nutrigenomics Topic 14. Genetic bases of complex diseases Topic 15. Genetic variants that respond to nutrients



Temporary organization of learning:

Block of content	Number of sessions	Hours
UNIT I: INTRODUCTION TO CELL BIOLOGY	2,00	4,00
UNIT II: THE PLASMA MEMBRANE AND THE ENDOMEMBRANE SYSTEM	6,00	12,00
UNIT III: CELLULAR COMMUNICATION	2,00	4,00
UNIT IV: CYTOSKELETON	2,00	4,00
UNIT V: THE CORE	4,00	8,00
UNIT VI: THE CELL CYCLE	4,00	8,00
UNIT VII: GENETICS	8,00	16,00
UNIT VIII: NUTRIGENETICS	2,00	4,00



References

- Alberts, B. (2021). Introduction to Cell Biology (3rd ed.). Panamericana Medical Ed.
 - Cooper GM and Hausman RE. (2021). The cell. (8th edition). Ed. Marbán.
 - Campbell and Reece. Biology. Ed. Panamericana. 7th edition
 - Harvey, L. (2005). Cellular and molecular biology. (5th ed). Pan-American Medical.
 - Novo, F.J. (2006). Human Genetics. Concepts, mechanisms and applications of Genetics in the field of Biomedicine. Pearson Prentice Hall.
- Thompson & Thompson. (2016) Genetics in Medicine, 8th ed.
- Griffiths, A. (2008). Genetics (9th ed.). McGraw-Hill.
- Nutrition Treaty. Molecular bases of nutrition. Angel Gil. 3rd edition Ed. Panamericana
- D. De Lorenzo (2018) Nutrigenomics and Nutrigenetics. Libbooks Barcelona
- Klug, Cummings, Spencer: CONCEPTS OF GENETICS (10th Edition) (2013) Ed. Pearson



Addendum to the Course Guide of the Subject

Due to the exceptional situation caused by the health crisis of the COVID-19 and taking into account the security measures related to the development of the educational activity in the Higher Education Institution teaching area, the following changes have been made in the guide of the subject to ensure that Students achieve their learning outcomes of the Subject.

Situation 1: Teaching without limited capacity (when the number of enrolled students is lower than the allowed capacity in classroom, according to the security measures taken).

In this case, no changes are made in the guide of the subject.

Situation 2: Teaching with limited capacity (when the number of enrolled students is higher than the allowed capacity in classroom, according to the security measures taken).

In this case, the following changes are made:

1. Educational Activities of Onsite Work:

All the foreseen activities to be developed in the classroom as indicated in this field of the guide of the subject will be made through a simultaneous teaching method combining onsite teaching in the classroom and synchronous online teaching. Students will be able to attend classes onsite or to attend them online through the telematic tools provided by the university (videoconferences). In any case, students who attend classes onsite and who attend them by videoconference will rotate periodically.

In the particular case of this subject, these videoconferences will be made through:

Microsoft Teams

Kaltura



Situation 3: Confinement due to a new State of Alarm.

In this case, the following changes are made:

1. Educational Activities of Onsite Work:

All the foreseen activities to be developed in the classroom as indicated in this field of the guide of the subject, as well as the group and personalized tutoring, will be done with the telematic tools provided by the University, through:

Microsoft Teams

Kaltura

Explanation about the practical sessions:

Las prácticas se llevarán a cabo mediante videoconferencia por Microsoft Teams .



2. System for Assessing the Acquisition of the competences and Assessment System

ONSITE WORK

Regarding the Assessment Tools:

The Assessment Tools will not be modified. If onsite assessment is not possible, it will be done online through the UCVnet Campus.

The following changes will be made to adapt the subject's assessment to the online teaching.

Course guide		Adaptation	
Assessment tool	Allocated percentage	Description of the suggested changes	Platform to be used

The other Assessment Tools will not be modified with regards to what is indicated in the Course Guide.

Comments to the Assessment System: