



## Information about the course

**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 Sciences Module

**Subject Matter:** Biología **Type:** Formación Básica

**Branch of knowledge:**

**Department:** Pathology

**Type of learning:** Classroom-based learning

**Language/-s in which it is given:** Spanish

**Teachers:**

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## Module organization

### Basic Sciences Module

Subject Matter	ECTS	Subject	ECTS	Year/semester
Biología	6	Biology and Genetics	6	1/1
Bioquímica	6	Biochemistry	6	1/2
Química	12	Basic Fundamentals of Chemistry	6	1/1
		Organic Chemistry	6	1/2
Fisiología	12	Physiology	6	1/2
Estadística	6	Biostatistics	6	1/1
Anatomía Humana	6	Human Anatomy	6	1/1
Antropología	12	Anthropology	6	1/1
Microbiología	6	Microbiology and Parasitology	6	1/2
Inglés	6	English	6	1/2

## Recommended knowledge



**PREREQUISITES:** None established.

**GENERAL OBJECTIVES:**

The general objective of this course is for students to acquire the biological and genetic foundations applied to human nutrition and dietetics. Biology studies the origin, evolution, and properties of living organisms, while genetics focuses on the mechanisms of inheritance transmitted from generation to generation.

Throughout the course, students will analyze the structural and molecular aspects that form the cellular basis of organisms, gaining a comprehensive overview of the cell and its main functions. In addition, human genetics will be introduced, along with the basic principles of genome organization and inheritance patterns from a nutrigenetic perspective.

The ultimate aim is for students to understand how genetic variants can influence the biological response to different nutrients and modulate susceptibility to the development of complex diseases.



## Learning outcomes

At the end of the course, the student must demonstrate having acquired the following learning outcomes:

R1 - Compt1 - - To be able, through arguments or procedures developed and supported by themselves, to apply their knowledge, understanding of these and their problem-solving abilities in complex or professional and specialized work environments that require the use of creative and innovative ideas.

Learning outcomes of the specified title

**Type of AR:** Habilidades o Destrezas

- Having the ability to collect and interpret data and information on which to base their conclusions, including, when necessary and relevant, reflection on social, scientific or ethical issues within their field of study.

**Type of AR:** Conocimientos o contenidos

- Having acquired advanced knowledge and demonstrated an understanding of the theoretical and practical aspects and the working methodology in their field of study with a depth that reaches the forefront of knowledge.

**Type of AR:** Competencias

- To be able, through arguments or procedures developed and supported by themselves, to apply their knowledge, understanding of these and their problem-solving abilities in complex or professional and specialized work environments that require the use of creative and innovative ideas.

R2 - Compt3 - - Develop theoretical and practical answers based on the sincere search for the full truth and the integration of all dimensions of the human being in the face of the great questions of life.

Learning outcomes of the specified title

**Type of AR:** Habilidades o Destrezas



- Having the ability to collect and interpret data and information on which to base their conclusions, including, when necessary and relevant, reflection on social, scientific or ethical issues within their field of study.

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**Type of AR:** Conocimientos o contenidos

- Having acquired advanced knowledge and demonstrated an understanding of the theoretical and practical aspects and the working methodology in their field of study with a depth that reaches the forefront of knowledge.

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**Type of AR:** Competencias

- To be able, through arguments or procedures developed and supported by themselves, to apply their knowledge, understanding of these and their problem-solving abilities in complex or professional and specialized work environments that require the use of creative and innovative ideas.

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R3 - Con1 - - To have acquired advanced knowledge and demonstrated an understanding of the theoretical and practical aspects and the working methodology in their field of study with a depth that reaches the forefront of knowledge.

Learning outcomes of the specified title

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**Type of AR:** Habilidades o Destrezas

- Having the ability to collect and interpret data and information on which to base their conclusions, including, when necessary and relevant, reflection on social, scientific or ethical issues within their field of study.

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**Type of AR:** Conocimientos o contenidos

- Having acquired advanced knowledge and demonstrated an understanding of the theoretical and practical aspects and the working methodology in their field of study with a depth that reaches the forefront of knowledge.

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**Type of AR:** Competencias

- To be able, through arguments or procedures developed and supported by themselves, to apply their knowledge, understanding of these and their problem-solving abilities in complex or professional and specialized work environments that require the use of creative and innovative ideas.



R4 - Hab1 - - Have the ability to collect and interpret data and information on which to base their conclusions, including, when necessary and relevant, reflection on social, scientific or ethical issues within their field of study.

Learning outcomes of the specified title

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**Type of AR:** Habilidades o Destrezas

- Having the ability to collect and interpret data and information on which to base their conclusions, including, when necessary and relevant, reflection on social, scientific or ethical issues within their field of study.

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**Type of AR:** Conocimientos o contenidos

- Having acquired advanced knowledge and demonstrated an understanding of the theoretical and practical aspects and the working methodology in their field of study with a depth that reaches the forefront of knowledge.

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**Type of AR:** Competencias

- To be able, through arguments or procedures developed and supported by themselves, to apply their knowledge, understanding of these and their problem-solving abilities in complex or professional and specialized work environments that require the use of creative and innovative ideas.

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## Assessment system

### In-person modality

Assessed learning outcomes	Granted percentage	Assessment tool
	15,00%	Assessment of individual or group activities or practical exercises, which require students to research and organize information related to each subject, and solve cases or problems. This is done through a continuous assessment system throughout the course, which involves the submission and/or presentation of assignments, the objectives and content of which will be set by the instructor.
	15,00%	Evaluation of practical work in the laboratory, or culinary techniques workshop laboratory, through which the acquired skills must be demonstrated and that one is able to use them to solve the different situations and problems that arise in a laboratory; this evaluation may be carried out through one of the following methods, or a combination of several of them: an individual written test, the individual or group performance of a laboratory experiment, the submission of an individual or group report on the work carried out in the laboratory.
	65,00%	Written assessment of the knowledge and skills acquired. This 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).
	5,00%	Evaluation of the effectiveness of practical classroom classes, problem-solving or computer science sessions, seminars and tutorials. Through attendance and participation in the various activities planned.

### Observations

In this course, the option of a single final assessment is not ??????????ed, as the compulsory completion of practical activities with active student participation is required. At the end of each



topic, students must submit an assessable questionnaire (written or Kahoot-style) including questions and/or problem-solving tasks. The submission of assignments will be assessed through a continuous assessment system based on periodic submissions, in which their resolution or progression will be reviewed.

**CRITERIA FOR THE AWARD OF HONOURS (MATRÍCULA DE HONOR):** In accordance with the regulations governing assessment and grading currently in force at UCV, the distinction of "*Matrícula de Honor*" may be awarded to students who obtain a final grade equal to or higher than 9.0. The number of *Matrículas de Honor* awarded may not exceed five percent of the students enrolled in the group in the corresponding academic year, unless the total number of enrolled students is fewer than 20, in which case a single *Matrícula de Honor* may be awarded. Exceptionally, *Matrículas de Honor* may be awarded globally across the different groups of the same course. In such cases, the total number of honours awarded shall be the same as if they were assigned per group; however, they may be distributed among all students according to a common criterion, regardless of the group to which they belong.

The criteria for awarding *Matrícula de Honor* will be established by the lecturer responsible for the course and detailed in the "Observations" section of the assessment system in the course syllabus.

**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.

## Training activities

The methodologies to be used so that the students reach the expected learning outcomes will be the following:

### IN-CLASS TRAINING ACTIVITIES





ACTIVITY	RELATIONSHIP WITH THE COURSE LEARNING OUTCOMES	METHODOLOGY	HOURS	ECTS
ASSESSMENT	R1, R3, R4		2,00	0,08
TUTORING	R1, R3, R4		2,00	0,08
GROUP WORK PRESENTATION	R1, R3, R4		6,00	0,24
LABORATORY	R3, R4		15,00	0,60
PRACTICAL CLASSES	R3		5,00	0,20
THEORETICAL CLASSES	R1, R3, R4		30,00	1,20
<b>TOTAL</b>			<b>60,00</b>	<b>2,40</b>
<b>TRAINING ACTIVITIES OF AUTONOMOUS WORK</b>				
ACTIVITY	RELATIONSHIP WITH THE COURSE LEARNING OUTCOMES	METHODOLOGY	HOURS	ECTS
INDEPENDENT GROUP WORK			20,00	0,80
I N D I V I D U A L SELF-EMPLOYMENT			70,00	2,80
<b>TOTAL</b>			<b>90,00</b>	<b>3,60</b>



## Description of contents

Description of content necessary for the acquisition of learning outcomes.

### Theoretical content:

#### Block of content

#### Contents

#### UNIT I: INTRODUCTION TO CELL BIOLOGY

**Topic 1.** Introduction: origin and evolution of cells. Cell theory. Prokaryotic and eukaryotic cells. Animal and plant cells. Cell composition.

#### UNIT II: THE PLASMA MEMBRANE AND THE ENDOMEMBRANE SYSTEM

**Topic 2.** Structure and function of the membrane. **Topic 3.** Membrane permeability and transport. **Topic 4.** Endoplasmic reticulum. Golgi apparatus. Mitochondria. Lysosomes and peroxisomes. Vacuoles. Vesicular transport. **Topic 5.** Endocytosis and exocytosis.

#### UNIT III: CYTOSKELETON

**Topic 6.** Structure and functions of the cytoskeleton: microtubules, microfilaments and intermediate filaments. Cell motility.

#### UNIT IV: THE NUCLEUS

**Topic 7.** Components of the nucleus. The DNA text. DNA packaging into chromosomes. Ribosomes.

#### UNIT V: THE CELL CYCLE

**Topic 8.** The cell cycle. Cell division: mitosis and meiosis.

#### UNIT VI: GENETICS

**Topic 9.** Fundamentals of genetics. Inheritance of genetic material. **Topic 10.** Chromosomal alterations. **Topic 11.** Genetic bases of metabolic diseases

#### UNIT VII: NUTRIGENETICS

**Topic 12.** Nutrigenetics and nutrigenomics. **Topic 13.** Genetic bases of complex diseases. **Topic 14.** Genetic variants involved in nutrient response.



### Temporary organization of learning:

Block of content	Sessions	Hours
UNIT I: INTRODUCTION TO CELL BIOLOGY	2	4,00
UNIT II: THE PLASMA MEMBRANE AND THE ENDOMEMBRANE SYSTEM	6	12,00
UNIT III: CYTOSKELETON	2	4,00
UNIT IV: THE NUCLEUS	4	8,00
UNIT V: THE CELL CYCLE	4	8,00
UNIT VI: GENETICS	9	18,00
UNIT VII: NUTRIGENETICS	3	6,00

## References

- Bruce Alberts, Dennis Bray, Karel Hopkin, Alexander Johnson. *Introduction to Cell Biology* – 2021. 3rd edition. Panamericana Medical Publishing.
- Cooper, G. M. & Hausman, R. E. (2021). *The Cell*. 8th edition. Marbán Publishing.
- Campbell & Reece. *Biology*. Panamericana Publishing. 7th edition.
- Harvey, L. (2016). *Cell and Molecular Biology*. 7th edition. Panamericana Medical Publishing.
- 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 edition.
- Griffiths, A. (2008). *Genetics*. 9th edition. McGraw-Hill.
- Gil, Á. (2017). *Treatise on Nutrition. Molecular Bases of Nutrition*. 3rd edition. Panamericana Publishing.
- De Lorenzo, D. (2018). *Nutrigenomics and Nutrigenetics*. Libbooks, Barcelona.
- Klug, Cummings & Spencer. (2013). *Concepts of Genetics*. 10th edition. Pearson.