1. OVERVIEW

Subject Area	Molecular Biology
Degree	Human Nutrition and Dietetics
School/Faculty	Biomedical and Health Sciences
Year	Second
ECTS	6
Type	Compulsory
Language(s)	Spanish
Delivery Mode	On-campus and blended
Semester	Third-party
Coordinating professor	Dr Esmeralda Parra-Peralbo

2. INTRODUCTION

Compulsory subject area within Module 1 'Core Sciences', delivered over one semester in the second year. The subject area of Molecular Biology is worth 6 ECTS credits.

The primary objective of this subject area is to introduce the main techniques and methods currently used in molecular biology laboratories. Molecular techniques play a huge role in advancement in the different areas of health sciences today. Nutritionists, as health professionals, must be familiar with the tools currently used for innovation in the field of precision nutrition.

3. SKILLS AND LEARNING OUTCOMES

Key skills (CB, by the acronym in Spanish):

- CB1: Students have shown their knowledge and understanding of a study area that builds on general secondary school education, and are usually at the level where, with the support of more advanced textbooks, they may also demonstrate awareness of the latest developments in their field of study.
- CB2: Students can apply their knowledge to their work professionally and possess the necessary skills, usually demonstrated by forming and defending opinions, as well as resolving problems within their study area.
- CB3: Students have the ability to gather and interpret relevant data (usually within their study area) to form opinions which include reflecting on relevant social, scientific or ethical matters.

- CB4: Students can communicate information, ideas, problems and solutions to both specialist and non-specialist audiences.

General skills (CG, by the acronym in Spanish):

- CG11: Be familiar with the microbiology, parasitology and toxicology of food.

Cross-curricular skills (CT, by the acronym in Spanish):

- CT1: Communication: ability to engage in active listening, ask questions and respond in a clear and concise way, as well as to effectively express ideas and concepts. This includes concise and clear written communication.
- CT4: Adaptability: ability to detect, interpret and respond to a changing environment. Ability to equip themselves and work effectively in different situations and/or with different groups or individuals.
- CT9: Ability to put knowledge into practice, using the skills acquired in the classroom to mock situations based on real life experiences that occur in the relevant profession.

Specific skills (CE, by the acronym in Spanish):

- CE16: Know the role of recombinant DNA.
- CE17: Know the basic techniques for analysing nucleic acids. Enzymes. Polymerase chain reaction (PCR). Sequencing.
- CE18: Be familiar with the applications of molecular biology to medicine, pharmacy and nutrition.

Learning outcomes (RA, by the acronym in Spanish):

- RA1: Understand the molecular mechanisms responsible for DNA replication and reparation, and how this is regulated in prokaryotes and eukaryotes.
- RA2: Understand the molecular mechanisms responsible for RNA transcription and processing, and how this is regulated in prokaryotes and eukaryotes.
- RA3: Understand the molecular mechanisms responsible for mRNA translation, and how this is regulated in prokaryotes and eukaryotes.

The following table shows how the skills developed in the subject area match up with the intended learning outcomes:

Skills	Learning outcomes
CB1-4, CG11, CT1,4,9, CE16-18	Understand the molecular mechanisms responsible for DNA replication and reparation, and how this is regulated in prokaryotes and eukaryotes.
CB1-4, CG11, CT1,4,9, CE16-18	Understand the molecular mechanisms responsible for RNA transcription and processing, and how this is regulated in prokaryotes and eukaryotes.
CB1-4, CG11, CT1,4,9, CE16-18	Understand the molecular mechanisms responsible for mRNA translation, and how this is regulated in prokaryotes and eukaryotes.

4. CONTENTS

Learning Unit 1: Genetic Material

- Topic 1: Introduction to Molecular Biology
- Topic 2: Nucleic acids

Learning Unit 2: Processing of Genetic Material

- Topic 3: DNA replication and reparation
- Topic 4a: Flow of genetic information
- Topic 4b: Regulation of gene expression

Learning Unit 3: Techniques for analysing nucleic acids

- Topic 5: Obtaining DNA molecules
- Topic 6: Nucleic acid hybridisation

Learning Unit 4: Recombinant DNA Technology

- Topic 7: Vectors and restriction enzymes
- Topic 8: Gene cloning

Learning Unit 5: Genomics and proteomics

- Topic 9: Sequencing. Human Genome Project
- Topic 10: Protein purification and analysis

Learning Unit 6: Applications of Biomolecules in Medicine

- Topic 11: Gene therapy
- Topic 12: Diagnostic techniques and producing new drugs

Learning Unit 7: Applications of Biomolecules in Agrifood Technology

- Topic 13: Genetically modified food
- Topic 14: Nutrigenomics and nutrigenetics

5. TEACHING/LEARNING METHODS

The types of teaching/learning methods are as follows:

- Lectures
- Learning based on workshops/labs
- Problem-based learning
- Collaborative learning
- Simulated environments

6. LEARNING ACTIVITIES

The types of learning activities, plus the amount of time spent on each activity, are as follows:

On campus:

Learning activity	Number of hours
Lecture	50
Independent working	37
Problem-solving	13
Debates and discussions	4
Workshops and/or lab work	18
Public spoken defence of work	7
Tutorials	14
Knowledge test	7
TOTAL	**150**

Blended learning

Learning activity	Number of hours
Reading of content	13
Online seminars	7
Independent working	45
Problem-solving	17
Debates and discussions	23
Workshops and/or lab work	18
Online tutorials	20
Knowledge test	7
TOTAL	**150**

7. ASSESSMENT

The assessment methods, together with their respective weighting towards the final grade for the subject, are as follows:

Assessment method	Weighting
Knowledge test	**50%**
Laboratory work	**25%**
Learning portfolio	**15%**
Performance observation	**10%**

Blended:

Assessment method	Weighting
Knowledge test	**50%**
Laboratory work	**20%**
Learning portfolio	**20%**
Performance observation	**10%**

On the Virtual Campus, when you open the subject area, you can see all the details of your assessment activities, including the deadlines and assessment procedures for each activity.

8. BIBLIOGRAPHY

The reference work for following this subject area is:

- Herráez A. (2012). *Texto ilustrado e interactivo de Biología molecular e Ingeniería genética*. Madrid: Elsevier.

The recommended bibliography is indicated below:

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- Parra-Peralbo, E. and Culi, J. (2011). *Drosophila lipophorin receptors mediate the uptake of neutral lipids in oocytes and imaginal disc cells by an endocytosis-independent mechanism.* PLoS Genet, vol. 10;7(2):e1001297. doi: 10.1371/journal.pgen.1001297.
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