1. OVERVIEW

Subject Area	Toxicology
Degree	Bachelor's Degree in Human Nutrition and Dietetics
School/Faculty	School of Biomedical and Health Sciences
Year	2nd year
ECTS	6 ECTS
Type	Compulsory
Language(s)	Spanish
Delivery Mode	On campus and blended
Semester	Semester 3
Coordinating professor	Dr Clara Colina Coca

2. INTRODUCTION

Compulsory subject area delivered over one semester in the second year of the Bachelor's Degree in Human Nutrition and Dietetics, within the Module 'Food Science'.

The overall objectives of the subject area are:

- Learn the basics of toxicology as a science, the mechanisms of action and the metabolism of the toxins in the food we eat or to which we are exposed.
- Identify the different families of toxins present naturally, through contamination or added to food.
- Be able to assess the risks of the different toxins present in food, know their nature, sources, doses, severity, reversibility and safety limits.
- Acquire basic knowledge of the method used to assess toxicity and risk.

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.

- 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):

- CGC11: 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.
- 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):

- CE64: Know the different branches of Toxicology and how they integrate with other disciplines.
- CE65: Know the toxic substances that are found naturally in food.
- CE66: Learn about toxicity derived from environmental contamination, additives, fungus and drug residues.
- CE67: Know how to complete a food toxicity assessment.

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

- RA1: Identify the mechanisms of action of xenobiotics and their metabolism.
- RA2: Identify and describe the dose, nature, incidence, severity, reversibility and overall mechanisms of toxic effects produced by xenobiotics that damage the body.
- RA3: Know the toxic effects of chemical substances that exist in or are added to food and therefore ingested.
- RA4: Know the toxicity of food additives, preservatives, flavour enhancers, etc.
- RA5: Know the main contaminants of food and their toxicity.
- RA6: Know how to carry out the appropriate analysis tests in order to assess toxins in food.

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

Skills	Learning outcomes
CB1, CB4, CT9, CE67	**RA1**. Identify the mechanisms of action of xenobiotics and their metabolism.
CB1, CB4, CB3, CT1, CT9, CE64, CE66, CE67	**RA2:** Identify and describe the dose, nature, incidence, severity, reversibility and overall mechanisms of toxic effects produced by xenobiotics that damage the body.
CB3, CB4, CT1,CGC11, CE64, CE65, CE66	**RA3:** Know the toxic effects of chemical substances that exist in or are added to food and therefore ingested.
CB3, CT9, CGC11, CE66	**RA4:** Know the toxicity of food additives, preservatives, flavour enhancers, etc.

Skills	Learning outcomes
CB1, CB3, CT9, CGC11, CE66	**RA5:** Know the main contaminants of food and their toxicity.
CB3,CB4, CGC11, CT9, CE67	**RA6:** Know how to carry out the appropriate analysis tests in order to assess toxins in food.

4. CONTENTS

The subject area is divided into five learning units, which are then divided into topics (two to four topics depending on the unit):

Learning Unit 1. Principles of Toxicology

Topic 1. General information about toxicology.

Topic 2. Food poisoning and the biological factors that influence it. Topic 3. Mechanisms of action of toxic substances.

Learning Unit 2. Food Toxicity Assessment

Topic 4. Identifying toxins in food. Topic 5. Toxicity testing. Topic 6. Toxicity criteria and toxic units.

Topic 7. Chemoprevention and ingredients that support health.

Learning Unit 3. Toxic Substances Found Naturally in Food

Topic 8. Natural toxins found in animal-based food. Topic 9. Natural toxins found in plant-based food. Topic 10. Toxic substances derived from fungi.

Learning Unit 4. Toxicity due to environmental contamination. Topic 11. Food contamination due to industrial waste. Topic 12. Residues of pesticides in food. Topic 13. Toxin infections and poisoning due to microorganisms and food allergies.

Learning Unit 5. Toxicity due to environmental contamination

Topic 14. Toxicity of additives.

Topic 15. Toxic substances derived from food processing.

5. TEACHING/LEARNING METHODS

The types of teaching/learning methods are as follows:

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

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	40
Problem-solving	20
Workshops and/or lab work	18
Spoken presentations by students	3
Tutorials	14
Knowledge test	5
TOTAL	**150 h**

Blended learning

Learning activity	Number of hours
Reading of content	10
Online seminars	10
Independent working	63
Problem-solving	30
Workshops and/or lab work	18
Online tutorials	14
Knowledge test	5
TOTAL	**150**

7. ASSESSMENT

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

On campus:

Assessment method	Weighting
Knowledge test	50%
Learning based on workshops/labs	20%
Learning portfolio	10%
Problem-solving	20%
Total	**100%**

Blended:

Assessment method	Weighting
Knowledge test	50%
Learning based on workshops/labs	20%
Learning portfolio	10%
Problem-solving	20%
Total	**100%**

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:

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