1. OVERVIEW

Subject Area	Introduction to Laboratory Work
Degree	Bachelor's Degree in Human Nutrition and Dietetics
School/Faculty	Biomedical and Health Sciences
Year	First
ECTS	3 ECTS
Type	Compulsory
Language(s)	Spanish
Delivery Mode	On-campus and blended
Semester	First semester
Coordinating professor	Sonia Moreno Pérez

2. INTRODUCTION

The subject area 'Introduction to Laboratory Work' is part of the 'Food Sciences' module and the overall subject of 'Experimental Chemistry'. It takes place in the first year of the Bachelor's Degree in Human Nutrition and Dietetics (on-campus and blended).

The overall objective of this subject area is to prepare students for completing other subject areas based on lab work. Students will focus on the study of basic aspects of material handling, operations and processing lab results. They will also study the concepts of quality and safety in the lab.

Knowledge of lab work in terms of material handling and basic operations, as well as learning the behaviour and attitude that should be adopted in this environment, is essential for studying a degree as predominantly experimental as the Bachelor's Degree in Nutrition, and will also later be useful for performing tasks inherent to the profession.

By the end of this subject area, students will be able to: select the appropriate techniques and procedures in the design, application and evaluation of reagents, methods and techniques of analysis; carry out standard laboratory processes including the use of scientific equipment for synthesis and analysis, including the appropriate instruments; estimate the risks associated with the use of chemical/biological substances and lab processes.

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):

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

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

- CT1: Ethical values: Ability to think and act in line with universal principles based on the value of a person, contributing to their development and involving commitment to certain social values.
- 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):

- CE68: Be familiar with basic lab operations, safety rules and precautions, as well as waste disposal.
- CE69: Know how to interpret the results of chemical reactions.

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

- RA1: Know basic lab operations. Safety rules and precautions.
- RA2: Know how waste disposal is carried out.
- RA3: Know the main tools and apparatus used in a lab.
- RA4: Learn how to interpret results.

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

Skills	Learning outcomes
CB1, CB3, CB4, CG11, CT9, CE68	RA1: Know basic lab operations. Safety rules and precautions.
CB1, CB3, CB4, CG11, CT9, CE68	RA2: Know how waste disposal is carried out.
CB1, CB3, CB4, CG11, CT9, CE69	RA3: Know the main tools and apparatus used in a lab.
CB1, CB3, CB4, CG11, CT1, CT9, CE69	RA4: Learn how to interpret results.
CB1, CB3, CB4, CG11, CT9, CE68	RA1: Know basic lab operations. Safety rules and precautions.

4. CONTENTS

The subject area is divided into three learning units, which are then divided into topics (number depending on the unit):

Unit 1. Safety and waste management

• Tema1: Safety and waste management.
Accident prevention.
Emergency procedures and safety equipment.
Chemical hazard guide.
Radiological hazards guide.
Biological hazards guide.
Waste management.

Unit 2. Basic lab equipment and operations

• Topic 2. Lab consumables and equipment.

• Topic 3. Reagents and solvents.

• Topic 4. Reactions.
Agitation.
Addiction.
Reflux.
Extraction.
Drying.
Filtration.
Crystallisation.
Distillation.
Sublimation.
Microbial culture.

Unit 3. Documentation, research and interpreting results

• Topic 5. Quality and documentation in the lab.
Quality and organisation.
Good laboratory practice (GLP).
GLP documentation.

• Topic 6. Calculations and interpretation of results.
Precision and accuracy.
Significant figures.
Calculations.
Units of measurement.
Dilution.
Scientific reports.

• Topic 7. Scientific articles.
Literature searches.
Scientific articles.

5. TEACHING/LEARNING METHODS

The types of teaching/learning methods are as follows:

- Lecture
- Problem-based learning
- Learning based on workshops/labs
- 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	25 h
Independent working	15 h
Workshops and/or lab work	9 h
Tutorials	14 h
Knowledge tests	5 h
Problem-solving	7 h
TOTAL	**75 h**

Blended learning

Learning activity	Number of hours
Reading of content	5 h
Online seminars	10 h
Independent working	22 h
Workshops and/or lab work	9 h
Problem-solving	10 h
Online tutorials	14 h
Knowledge tests	5 h
TOTAL	**75 h**

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%
Problem-solving	20%
Learning portfolio	10%

Blended:

Assessment method	Weighting
Knowledge test	50%
Learning based on workshops/labs	20%
Problem-solving	20%
Learning portfolio	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:

- PDF files for the subject area provided by the teaching team.

The recommended bibliography is indicated below:

- F. Simón, M. I. Lorenzo, F. Gómez-Aguado, B. Hernández. Técnicas generales de laboratorio. Módulo transversal. Sanidad. Altamar S.A. 2015.

- Rodríguez Pérez CM, Ravelo Socas JL, Palazón López JM. Técnicas de organización y seguridad en el laboratorio. Madrid: Síntesis; 2008.

- (E-book) Spellman FR. Chemistry for nonchemists. Lanham, Md.: Government Institutes; 2006.
- Kathy Barker. At the bench: a laboratory navigator. Cold Spring Harbor Laboratory Press. 2005.
- Kaaren Janssen. Career Options for Biomedical Scientists.Cold Spring Harbor Laboratory Press. 2015
- David J. Glass. Experimental Design for Biologists. Cold Spring Harbor Laboratory Press. 2014
- Dany Spencer Adams. Lab Math: A Handbook of Measurements, Calculations, and Other Quantitative Skills for Use at the Bench. Cold Spring Harbor Laboratory Press. 2014

Websites:

- INSTITUTO NACIONAL DE SEGURIDAD E HIGIENE EN EL TRABAJO, *http://www.insht.es/portal/site/Insht*
- SIGMA-ALDRICH: http://www.sigmaaldrich.com/safety-center.html
- Occupational Safety & Health Administration https://www.osha.gov/
- Guidelines for Quality Management in Soil and Plant Laboratories. (FAO Soils Bulletin - 74) http://www.fao.org/docrep/w7295e/w7295e00.htm#Contents
- Manual de seguridad y salud en los laboratorios. Fremap. http://prevencion.fremap.es/MaterialDivulgativo/Paginas/Manuales.aspx