1. OVERVIEW

Subject Area	Statistics
Degree	Bachelor's Degree in Human Nutrition and Dietetics
School/Faculty	Biomedical and Health Sciences
Year	First
ECTS	6 ECTS
Type	Compulsory
Language(s)	Spanish
Delivery Mode	On-campus and blended
Semester	Semester 2
Coordinating professor	Dr Sara Sanz Rojo

2. INTRODUCTION

The subject area Statistics is a core subject area worth 6 ECTS credits, delivered over one semester in the first year of the Bachelor's Degree in Human Nutrition and Dietetics.
The overall objective of the subject area is for students to learn the basic tools and analysis techniques used in biomedical, epidemiological and health research. Students will thus acquire knowledge of the statistical methods and skills required for good practice in health research.

This subject area will prepare students to apply statistical procedures in order to predict the probable outcome of a public health intervention programme, choose the most appropriate intervention for a patient or community, interpret the results obtained correctly and critically, and reach conclusions that can be applied to the population as a whole where only part of the population has been studied. The data obtained in this regard shall be valid, comparable, verifiable and repeatable.

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):

- CG27: Take action in terms of food quality and safety, with regard to products, facilities and processes.

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

- 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. This means adapting to change depending on circumstances or needs. It involves the confidence to take on crucial challenges on a personal or group level, maintaining good physical and mental health to allow effective work to be carried out.

- CT6: Problem solving: ability to solve an unclear or complex issue or situation which has no established solution and requires skill to reach a conclusion.

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

- CE22: Know the basic concepts of statistics and how they are applied in health sciences.

- CE23: Understand and know how to complete: Descriptive statistics. Adjustment and regression between two variables. Correlation Analysis.

- CE24: Understand and know how to apply concepts of: Probability. Sampling and estimates. Hypothesis testing.

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

- RA1: Knowledge of statistical sciences applied to Health Sciences.
- RA2: Apply statistical techniques to problems related to health.
- RA3: Be able to evaluate scientific data through statistical procedures.

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

Skills	Learning outcomes
CG27, CB1, CB3, CB4, CT4,CT6, CE22, CE23, CE24	**RA1:** Knowledge of statistical sciences applied to Health Sciences.
CG27, CB1, CB3, CB4, CT4,CT6, CE22, CE23, CE24	**RA2:** Apply statistical techniques to problems related to health.

CG27, CB3, CB4, CT6,CE22, CE23, CE24	**RA3:** Be able to evaluate scientific data through statistical procedures.

4. CONTENTS

This subject area is divided into 4 learning units, which are then divided into various topics:

BLOCK 1: DESCRIPTIVE STATISTICS AND PROBABILITY.
Unit 1. Basic concepts of statistics and how they are applied in health sciences. Descriptive statistics
Topic 1. Statistics applied to public health.
Topic 2. Descriptive statistics.
Topic 2.1. Types of variables. Measures of localisation and dispersion.
Topic 2.2. Measures of dispersion. Graphical representation of variables and tabulation of data.

Unit 2. Probability. Sampling and sample size. Confidence intervals
Topic 3. Probability. Diagnostic testing: sensitivity, specificity and predictive values.
Topic 3.1. Diagnostic testing: sensitivity, specificity and predictive values. Topic 3.2. Probability.
Topic 4. Probability distribution.
Topic 4.1. Discrete distribution: Binomial and Poisson.
Topic 4.2. Continuous distribution: Normal distribution and normal derivatives.
Topic 5. Sampling and estimation of parameters, confidence intervals and sample sizes.

BLOCK 2: INFERENTIAL STATISTICS.
Unit 3. Hypothesis testing for statistical analysis. Qualitative and quantitative comparative statistics
Topic 6. Hypothesis testing.
Topic 7. Hypothesis testing for the comparison of qualitative variables.
Topic 8. Hypothesis testing for the comparison of means.
Topic 8.1. Comparison of means where variance is known.
Topic 8.2. Hypothesis testing: more than two independent means, related samples. Nonparametric hypothesis testing.
Unit 4. Predictive modelling and the correlation between quantitative variables. Topic 9. Correlation and regression.
Topic 10. Quantitative research methodology.

5. TEACHING/LEARNING METHODS

The types of teaching/learning methods are as follows:

- Lecture
- Collaborative learning
- Problem-based learning
- Simulated environments
- Spoken presentations by students

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	30
Problem-solving	20
Workshops and/or lab work	7
Group activities	11
Spoken presentations by students	8
Tutorials	14
Knowledge test	10
TOTAL	**150**

Blended learning

Learning activity	Number of hours
Reading of content	10
Online seminars	10
Independent working	57
Workshops and/or lab work	7
Online tutorials	16
Knowledge test	10
Problem-solving	40
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
Problem-solving	20%
Learning portfolio	20%
Spoken presentation	10%
Knowledge test	50%

Blended learning

Assessment method	Weighting
Problem-solving	30%
Learning portfolio	10%
Spoken presentation	10%
Knowledge test	50%

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

General bibliography:

- Milton J.S. (2007). "Estadística para Biología y Ciencias de la Salud". McGraw-Hill. Interamericana de España, S.A.U.
- Macchi, Ricardo Luis (2005). "Introducción a la estadística en Ciencias de la Salud". Editorial Médica Panamericana.
- Peña, Daniel. (2013). "Fundamentos de estadística". Alianza Editorial.
- Sánchez González, Juana Mª. (2012). "Introducción a la estadística: Introducción a la estadística descriptiva". Ed. Instituto Juan de Herrera, Escuela Técnica Superior de Arquitectura.
- Lara Porras, Ana María. (2000). "Estadística para ciencias biológicas y ciencias ambientales: problemas y exámenes resueltos". Ed. Proyecto Sur.
- Campos Aranda, Matilde. (2009)." Problemas de bioestadística resueltos paso a paso". Murcia, DM.
- Martínez González, Miguel Ángel. (2009) "Bioestadística Amigable". Editorial Elsevier.
- Álvarez Cáceres, Rafael (2007). "Título: Estadística aplicada a las ciencias de la salud". Ed. Díaz de Santos, cop.
- Martín Mateo, Miguel [et al.]. (2010). "Fundamentos de estadística en ciencias de la salud". Ed.

Bellaterra: Universitat Autònoma de Barcelona.
- García Roldán, José Luis. (2007) “Cómo Elaborar Un Proyecto De Investigación”. Universidad de Alicante. Servicio de Publicaciones,
- López de la Manzanara Barbero, Juan. (2008). “Problemas de estadística”. Ed. Pirámide

Online resources:

- Spiegel, Murray R., Stephens, Larry J. (2009) “Estadística”, McGraw-Hill Interamericana.
- Triola, Mario F.; (2009) “Estadística”. Pearson Educación
- Milton J.S. (2007). “Estadística para Biología y Ciencias de la Salud”. McGraw-Hill. Interamericana de España, S.A.U.
- Recursos electrónicos gratuitos editados por la Comunidad Autónoma de Murcia
- “Atención sanitaria basada en la evidencia: su aplicación a la práctica clínica”
- “Metodología de la investigación y la práctica clínica basada en la evidencia. Programa transversal y complementario del residente (PTCR)” http://www.murciasalud.es/publicaciones.php?op=mostrar&tipo=descriptores&id=2303&idsec=88
- Fisterra: http://www.fisterra.com/formacion/metodologia-investigacion/
- Unidad de Bioestadística Clínica Hospital Ramón y Cajal: http://www.hrc.es/investigacion/bioest/M_docente.html

There will also be additional documentation available for students on the virtual campus.