



## Information about the subject

**Degree:** Bachelor of Science Degree in Podiatry

**Faculty:** Faculty of Medicine and Health Sciences

**Code:** 471104 **Name:** Biostatistics

**Credits:** 6,00 **ECTS Year:** 1 **Semester:** 1

**Module:** BASIC TRAINING

**Subject Matter:** STATISTICS **Type:** Basic Formation

**Field of knowledge:** Health Sciences

**Department:** Biostatistics, Epidemiology, and Public Health

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

**Languages in which it is taught:** Spanish

**Lecturer/-s:**

471A Francesc Josep Montoro Salvador (**Responsible  
Lecturer**)

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## Module organization

### BASIC TRAINING

Subject Matter	ECTS	Subject	ECTS	Year/semester
ANATOMY	12,00	Anatomy	6,00	1/1
		Anatomy of the Lower Extremity	6,00	1/2
BIOLOGY	12,00	Cellular and Tissular Biology	6,00	1/1
		Microbiology	6,00	1/2
PHARMACOLOGY	6,00	Pharmacology	6,00	2/1
MODERN LANGUAGE	6,00	English	6,00	2/2
STATISTICS	6,00	Biostatistics	6,00	1/1
PSYCHOLOGY	6,00	Psychology	6,00	1/2
PHYSIOLOGY	6,00	Physiology	6,00	1/1
BIOCHEMICALS	6,00	Biophysics and Biochemistry	6,00	1/1
ANTHROPOLOGY	6,00	Anthropology	6,00	1/2

## Recommended knowledge

Basic knowledge of Introduction to Probability. Equations of lines.



## Learning outcomes

At the end of the course, the student must be able to prove that he/she has acquired the following learning outcomes:

- R1 The student knows the tools of Descriptive Statistics (Tables, Graphs and Statistics) and knows which is applicable in each specific case, so that he or she is able to make a critical evaluation of the results a posteriori and thus decide if the solution obtained is reasonable according to the context in which the problem to be solved is formulated. The student also discerns whether the information is reasonable in light of the context in which the problem is formulated.
- R2 The student is capable of understanding and elaborating a descriptive study of a statistical variable, again in such a way that he can make a critical assessment of the results a posteriori that allows him to decide whether the solution obtained is reasonable according to the context in which the study is formulated. If necessary, it also consults the most appropriate sources of information and relies on some of the usual computer tools as a guarantee of its results.
- R3 The student is capable of understanding, quantifying and expressing the linear relationship between two numerical variables, as well as interpreting a two-dimensional descriptive statistics study in its treatment of this linear relationship. The criteria for evaluating this learning outcome coincide with those of R-1 and R-2.
- R4 Understands the basic principles of probability theory and is able to apply them to solve simple problems. Thus, given a verbalized problem, the student is capable of translating it into formal language, for the resolution of which he applies the techniques learned to solve it, his critical attitude being again evaluated to guarantee the suitability of the solution obtained.
- R5 He/she knows, applies and interprets correctly the statistical concepts applied to the diagnostic tests (relative risk, specificity, sensitivity) [in a future context, the student becomes a guarantor of diagnostic decision making with peers]. This result is evaluated based on the same criteria as in R-1, R-2, R-3 and R-4.
- R6 Understands and applies the basic concepts of random variable and probability distribution and knows the main discrete (Binomial, Poisson and Geometrical) and continuous (Uniform and Normal) distributions in such a way that he is also able to correctly interpret memories that include the use of them. Its evaluation follows the standards of those indicated in R-4.
- R7 The student knows and applies the basic tools of statistical inference (confidence intervals and hypothesis tests) using the tables of the Normal, Chi-2, t-student and F distributions. In addition, the student can correctly interpret with a critical attitude the results of the literature based on the confidence intervals and hypothesis tests.



## Competencies

Depending on the learning outcomes, the competencies to which the subject contributes are (please score from 1 to 4, being 4 the highest score):

### BASIC

#### Weighting

1 2 3 4

- CB3 Students have the ability to gather and interpret relevant data (usually within their area of study) to make judgments that include reflection on relevant social, scientific or ethical issues.

X

### GENERAL

#### Weighting

1 2 3 4

- CG3 Students develop the capacity, ability and skill necessary to diagnose, prescribe, indicate, perform and/or elaborate and evaluate any type of podiatric, orthopedic, chiropractic, podiatric surgery, physical, pharmacological, preventive and/or educational treatment, based on the clinical history.

X

- CG6 Students acquire the ability to perform patient-centred clinical management, health economics and efficient use of health resources, as well as effective management of clinical documentation, with particular attention to confidentiality.

X

- CG8 Acquire work skills in the educational and research environments, health care, as well as in uniprofessional and multiprofessional teams. Advise on the development and implementation of care and education policies on issues related to prevention and podiatry care

X

### SPECIFIC

#### Weighting

1 2 3 4



CE35 Students know, critically evaluate and know how to use technologies and sources of biomedical information, to obtain, organize, interpret and communicate scientific and health information. To know the basic concepts of biostatistics and its application. Use search and retrieval systems of biomedical information and understand and critically interpret scientific texts. Know the principles of the scientific method, biomedical research and clinical trials.

X

## TRANSVERSAL

## Weighting

1 2 3 4

CT1 Analytical capabilities

X

CT2 Organizational and planning skills

X

CT3 Oral and written communication in native language

X

CT5 Computer skills related to the field of study

X

CT6 Information management capacity

X

CT7 Problem solving

X

CT8 Decision making

X

CT14 Critical Reasoning

X

CT15 Ethical commitment

X

CT16 Autonomous learning

X

CT17 Adaptation to new situations

X

CT22 Motivation for quality

X



## Assessment system for the acquisition of competencies and grading system

Assessed learning outcomes	Granted percentage	Assessment method
R1, R2, R3, R4, R5, R6, R7	30,00%	Open questions
R1, R2, R3, R4, R5, R6, R7	55,00%	Tests
R1, R2, R3, R4, R5, R6, R7	15,00%	Oral presentation

### Observations

#### Assessment tools used to evaluate the achievement of learning outcomes include:

1. Solving basic numerical problems (practical assessment).
2. Short open-ended questions of both theoretical and practical nature (explicitly aimed at assessing conceptual knowledge and the ability to critically evaluate results).
3. Multiple-choice questions (assessment of theory and practice).
4. Development of exercises using Excel, SPSS, or similar software (assessment of theory and practice).

#### The assessment of the course will be based on two components:

##### 1. Final written exam (85%) The final exam will consist of two parts:

- A multiple-choice section with one correct answer among four or five options. Incorrect answers will be penalized according to a criterion that will be communicated in advance.
- A section of short open-ended or problem-solving questions.

##### 2. Deliverable assignment(s) or activity(ies) (15%) Throughout the course, one or more assignments or activities will be proposed, which may be completed individually or in groups. These may include exercises using spreadsheets (Excel, Google Sheets) or statistical software (SPSS, JASP).

- Submission dates will be unique and will be set in advance during the course.
- Late submissions will not be accepted.
- These assignments cannot be retaken or resubmitted.
- Failure to submit within the established deadline will be considered an explicit waiver of the 15% corresponding to this component of the course.

#### To pass the course, students must obtain a final grade equal to or higher than 5 out of 10, provided both of the following conditions are met:

- A minimum score of 5 in the final written exam.
- A minimum score of 5 in the weighted average (85% exam + 15% assignment(s)).



**Use of Artificial Intelligence (AI) tools** The use of Artificial Intelligence tools is permitted in this course, as long as their application aligns with the educational purpose of the activities and does not violate academic integrity. Accordingly, students may use AI tools for:

- Clarifying questions related to learning activities.
- Receiving alternative explanations or completing self-assessment exercises (assisted learning).
- Searching for additional study resources or references.

The use of AI tools is **not allowed** for:

- Recording or transcribing classroom activities, in whole or in part, for the purpose of generating summaries or notes using AI.
- Generating textual content for assignments or coursework.
- Presenting AI-generated content as one's own work.
- Entering the content of assignments, practical activities, or assessments into AI systems to obtain automated answers.

**Citation and attribution guidelines** If AI tools are used in any activity, students must explicitly indicate:

- Which part of the activity involved AI use.
- Which AI tool was used.
- The purpose of the AI use (e.g., source consultation, style analysis, knowledge expansion, etc.).

In case of doubt regarding the appropriate use of AI tools, students should consult the official document: "Principios Fundamentales para el Uso de Inteligencia Artificial", Version 1, presented by the Vicerrectorado de Ordenación Académica (04/06/2025), Universidad Católica de Valencia San Vicente Mártir.

## 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.



## Learning activities

The following methodologies will be used so that the students can achieve the learning outcomes of the subject:

- M1      Theoretical classes (TC). Training activity preferably oriented to the acquisition of knowledge skills. It is characterised by the fact that students are spoken to. Also called master class or expository class, it refers to the oral exposition made by the teacher, (with the support of a blackboard, computer and cannon for the exposition of texts, graphics, etc.).
- M5      Computer Practice (CPI). Training activity of work in groups that is developed in the Computer Classroom where the learning is developed using the computer as a support. It includes the work with computer models, specific software, web queries, etc. The size of the group is variable, in a range of 10-20 students.
- M7      Tutorials (T). Set of activities carried out by the teacher with personalised attention to the student or in small groups with the aim of reviewing and discussing the materials and topics presented in the classes, seminars, readings, completion of assignments, etc. The aim is to ensure that education is truly a comprehensive training of the student and is not reduced to a transfer of information. It is, therefore, a personalized relationship of help in which the teacher-tutor attends, facilitates and guides one or more students in the formative process.
- M8      Evaluation (Ev). It is the set of processes that try to evaluate the learning results obtained by the students and expressed in terms of acquired knowledge, capacities, developed skills or abilities and manifested attitudes. It covers a wide range of activities that can be developed for students to demonstrate their training (e.g. written, oral and practical tests, projects or assignments,). It also includes Official Calls.
- M10    Estudio del alumno: Preparación individual de lecturas, ensayos, resolución de problemas, seminarios





## IN-CLASS LEARNING ACTIVITIES

	LEARNING OUTCOMES	HOURS	ECTS
Theoretical lessons M1	R1, R2, R3, R4, R5, R6, R7	50,00	2,00
Practice lessons M5	R1, R2, R3, R4, R5, R6, R7	6,00	0,24
Office Hours M7	R1, R2, R3, R4, R5, R6, R7	1,00	0,04
Evaluation M8	R1, R2, R3, R4, R5, R6, R7	3,00	0,12
<b>TOTAL</b>		<b>60,00</b>	<b>2,40</b>

## LEARNING ACTIVITIES OF AUTONOMOUS WORK

	LEARNING OUTCOMES	HOURS	ECTS
Autonomous work M10	R1, R2, R3, R4, R5, R6, R7	72,00	2,88
Group work M10	R1, R2, R3, R4, R5, R6, R7	18,00	0,72
<b>TOTAL</b>		<b>90,00</b>	<b>3,60</b>



## Description of the contents

Description of the necessary contents to acquire the learning outcomes.

### Theoretical contents:

#### Content block

#### Contents

#### I. Statistical Conceptualization

##### **Unit 1: Descriptive Statistics (Univariate and Bivariate):**

Types of variables, tabulation, graphical representation, summary measures, linear regression.

##### **Unit 2: Basic concepts of Probability:**

Random variables. Probability distribution models for discrete and continuous random variables. Normal distribution. Applications.

**Unit 3: Statistical Inference:** Parameter estimation and hypothesis testing.

#### II. Applied Statistics. Data Treatment

##### **Unit 1: Descriptive Statistics (Univariate and Bivariate):**

Types of variables, tabulation, graphical representation, summary measures, linear regression.

##### **Unit 2: Basic concepts of Probability:**

Random variables. Probability distribution models for discrete and continuous random variables. Normal distribution. Applications.

**Unit 3: Statistical Inference:** Parameter estimation and hypothesis testing.



## Temporary organization of learning:

Block of content	Number of sessions	Hours
I. Statistical Conceptualization	22,00	44,00
II. Applied Statistics. Data Treatment	8,00	16,00

## References

- Álvarez R, Estadística aplicada a las ciencias de la salud. Ediciones Díaz de Santos. Madrid: 2007
- Cumming, G. *Understanding the new statistics: Effect sizes, confidence intervals, and meta-analysis*. Routledge. 2013
- Field, A. *Discovering statistics using IBM SPSS statistics*. sage. 2013
- Field, A., Miles, J., & Field, Z. *Discovering Statistics Using R*. 2012
- Martín G, Introducción a la estadística. Universidad Católica de Valencia, Valencia: 2009
- Martín G, Prácticas de estadística básica con SPSS. Universidad Católica de Valencia, Valencia: 2012
- Martínez González MA, Sánchez-Villegas A, Toledo Atucha E y Faulin Fajardo J. *Bioestadística amigable*. 4ª ed. Barcelona: Elsevier: 2020
- Ramírez, M. T. G., & Botella, J. Comparison among Effect-Size indices for dichotomized outcomes in Meta-analysis. *Psicológica*, 27(2), 269-293.
- Levitin, D. J. (2016). *A field guide to lies: Critical thinking in the information age*. Penguin.
- Egger, M., Higgins, J. P., & Smith, G. D. (Eds.). (2022). *Systematic Reviews in Health Research: Meta-Analysis in Context*. John Wiley & Sons.
- Schwarzer, G. (2022). Meta-Analysis in R. *Systematic Reviews in Health Research: Meta-Analysis in Context*, 510-534



## Addendum to the Course Guide of the Subject

Due to the exceptional situation caused by the health crisis of the COVID-19 and taking into account the security measures related to the development of the educational activity in the Higher Education Institution teaching area, the following changes have been made in the guide of the subject to ensure that Students achieve their learning outcomes of the Subject.

**Situation 1: Teaching without limited capacity** (when the number of enrolled students is lower than the allowed capacity in classroom, according to the security measures taken).

In this case, no changes are made in the guide of the subject.

**Situation 2: Teaching with limited capacity** (when the number of enrolled students is higher than the allowed capacity in classroom, according to the security measures taken).

In this case, the following changes are made:

### 1. Educational Activities of Onsite Work:

All the foreseen activities to be developed in the classroom as indicated in this field of the guide of the subject will be made through a simultaneous teaching method combining onsite teaching in the classroom and synchronous online teaching. Students will be able to attend classes onsite or to attend them online through the telematic tools provided by the university (videoconferences). In any case, students who attend classes onsite and who attend them by videoconference will rotate periodically.

In the particular case of this subject, these videoconferences will be made through:

☒ Microsoft Teams

☐ Kaltura



## **Situation 3: Confinement due to a new State of Alarm.**

In this case, the following changes are made:

### **1. Educational Activities of Onsite Work:**

All the foreseen activities to be developed in the classroom as indicated in this field of the guide of the subject, as well as the group and personalized tutoring, will be done with the telematic tools provided by the University, through:

☒ Microsoft Teams

☐ Kaltura

Explanation about the practical sessions:



## 2. System for Assessing the Acquisition of the competences and Assessment System

### ONSITE WORK

#### Regarding the Assessment Tools:

☒ The Assessment Tools will not be modified. If onsite assessment is not possible, it will be done online through the UCVnet Campus.

☐ The following changes will be made to adapt the subject's assessment to the online teaching.

Course guide		Adaptation	
Assessment tool	Allocated percentage	Description of the suggested changes	Platform to be used

The other Assessment Tools will not be modified with regards to what is indicated in the Course Guide.

#### Comments to the Assessment System: