Information about the subject

Degree: Bachelor of Science Degree in Physiotherapy

Faculty: Faculty of Medicine and Health Sciences

Code: 241201 **Name:** Biostatistics

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

Module: MODULE 1: BASIC FORMATION

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:

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241Q	Francesc Josep Montoro Salvador **(Responsible Lecturer)**	fj.montoro@ucv.es

Module organization

MODULE 1: BASIC FORMATION

Subject Matter	ECTS	Subject	ECTS	Year/semester
Anatomy	18,00	Anatomy I	6,00	1/1
		Anatomy II	6,00	1/2
		Cellular and Molecular Biology	6,00	1/1
Physiology	18,00	Biomechanics and Applied Physics	6,00	2/1
		Physiology I	6,00	1/2
		Physiology II	6,00	2/1
Applied psychosocial sciences	12,00	Anthropology	6,00	1/2
		Psychology	6,00	1/2
Statistics	6,00	Biostatistics	6,00	1/1
Modern Language	6,00	English	6,00	1/1

Recommended knowledge

·Basic knowledge of Introduction to Probability.
·Knowledge of Mathematics. For example:
Basic arithmetic and algebra. Operations with fractions and decimals. Solving simple equations.
·Basic software usage:
Familiarity with using spreadsheets (e.g., Microsoft Excel, Google Sheets).

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 if 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.

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].

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.

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 from the literature based on 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
CB1	Students demonstrate knowledge and understanding in an area of study that is at the core of general secondary education, and is often at a level that, while supported by advanced textbooks, also includes some aspects that involve knowledge from the cutting edge of their field of study.			x	
CB2	Students know how to apply their knowledge to their work or vocation in a professional way and possess the skills usually demonstrated by developing and defending arguments and solving problems within their area of study.				x
CB5	Students develop those learning skills necessary to undertake further studies with a high degree of autonomy.			x	

SPECIFIC		Weighting			
		1	2	3	4
CE9	Students assimilate theories of communication and interpersonal skills.	x			
CE10	Learning theories to be applied in health education and in your own lifelong learning process		x		
CE17	Students manage research and evaluation methodologies that allow the integration of theoretical perspectives and research experiences in the design and implementation of effective physiotherapy.				x
CE18	Students resort to theories that support problem-solving capacity and clinical reasoning.		x		
CE51	Show respect, appreciation and sensitivity to the work of others.		x		
CE54	Work responsibly, which means being able to cope with the activities of your job without the need for strict supervision.		x		

TRANSVERSAL		Weighting			
		1	2	3	4
CT1	Decision-making			x	
CT2	Problem solving.			x	
CT3	Capacity for organization and planning.			x	
CT4	Analysis and synthesis capacity.			x	
CT5	Oral and written communication in the native language.		x		
CT6	Information management capacity.		x		
CT7	Computer skills related to the field of study.		x		
CT8	Knowledge of a foreign language.			x	
CT9	Ethical commitment.		x		
CT10	Teamwork.		x		
CT11	Interpersonal relationship skills.		x		
CT12	Work in an interdisciplinary team		x		
CT13	Critical Reasoning			x	
CT14	Work in an international context.	x			
CT15	Recognition of diversity and multiculturalism	x			
CT16	Motivation for quality	x			
CT17	Adaptation to new situations.	x			
CT18	Creativity	x			

CT19	Autonomous learning			x
CT20	Initiative and entrepreneurship	x		
CT21	Leadership.	x		
CT22	Knowledge of other cultures and customs	x		
CT23	Sensitivity to environmental issues.	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	35,00%	OPEN QUESTIONS: Written exam in which theoretical knowledge and the student's ability to relate, integrate and express it coherently in written language are evaluated. It allows the following generic or transversal skills to be assessed: 4 Capacity for analysis and synthesis. 3 Capacity for organisation and planning. 5 Oral and written communication in the native language. 8 Knowledge of a foreign language. 2 Problem-solving 19 Autonomous learning.
R1, R2, R3, R4, R5, R6, R7	35,00%	TEST TYPE: Multiple choice test with one correct answer out of five possible ones. It allows the student to know in greater detail the contents acquired by him/her. It allows the following generic or transversal competences to be assessed: 2 Problem solving 1 Decision making 13 Critical thinking
R1, R2, R3, R4, R5, R6, R7	30,00%	WORKS: The student, individually or in a group, elaborates a revision or research topic and presents it, in writing, for the evaluation by the teacher. The following generic or transversal competences are valued: 4 Capacity for analysis and synthesis. 3 Capacity for organisation and planning. 7 Computer skills. 6 Information management skills. 10 Teamwork. 14 Working in an international context. 11 Interpersonal skills. 13 Critical thinking. 19 Autonomous learning. 18 Creativity. 21 Leadership. 20 Initiative and entrepreneurship. 16 Motivation for Quality. 70 Maintaining an attitude of learning and improvement. 72 Knowing one's own skills and limitations.

Observations

The assessment tools used to measure the achievement of learning outcomes are as follows:
·Solving simple numerical problems (practical assessment).
·Short open-ended questions of both practical and theoretical nature (with the clear intention of evaluating conceptual knowledge and the ability to critically assess results).
·Multiple-choice questions (assessment of theory and practice).
·Development of exercises using Excel, SPSS, or JASP (assessment of theory and practice).
Regarding the evaluation system, it will be structured as follows:
During the course, one or more deliverable assignments/activities will be carried out, which can be completed individually or in groups. These activities may include or be combined with practical work using Excel, SPSS, or JASP. The average of the grades for these assignments will account for 30% of the final grade, with the remaining 70% being determined by the exam. The deadlines for submitting these assignments or deliverables will be fixed and set during the course. Late submissions will not be accepted and there will not be resubmission.
A minimum grade of 5 in the final exam is required to pass the course and to average the grade with the assignments/activities.

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	Master class Problem solving Exposition of contents by the teacher. Explanation of knowledge and skills
M5	Set of tests carried out to know the degree of acquisition of knowledge and skills of the student.

M6 Problem solving and case studies Written work Online activity in the e-learning platform Personal study. Search of information and documentation.

M7 Discussion and problem solving.

M12 Group work: Group work sessions supervised by the teacher. Knowledge construction through student interaction and activity.

M15 Seminar, supervised monographic sessions with shared participation

M16 Student's study: Individual preparation of readings, essays, problem solving, seminars.

IN-CLASS LEARNING ACTIVITIES

	LEARNING OUTCOMES	HOURS	ECTS
Theoretical lessons M1, M15	R1, R2, R3, R4, R5, R6, R7	37,00	1,48
Practice lessons M7, M12	R2, R5, R6, R7	18,00	0,72
Office Hours M7, M15	R1, R2, R3, R4, R5, R6, R7	2,00	0,08
Assessment M5	R1, R2, R3, R4, R5, R6, R7	3,00	0,12
TOTAL		**60,00**	**2,40**

LEARNING ACTIVITIES OF AUTONOMOUS WORK

	LEARNING OUTCOMES	HOURS	ECTS
Autonomous work M6, M16	R1, R2, R3, R4, R5, R6, R7	90,00	3,60
TOTAL		**90,00**	**3,60**

Description of the contents

Description of the necessary contents to acquire the learning outcomes.

Theoretical contents:

Content block	Contents
BIOSTATISTICS	**Unit 1: Unidimensional and bidimensional descriptive Statistics** (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. **Unit 3: Statistical Inference**. Estimation and hypothesis testing.

Temporary organization of learning:

Block of content	Number of sessions	Hours
BIOSTATISTICS	30,00	60,00

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 publications limited. 2024

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

Mendenhall, W., & Beaver, R. J. (2010). Introducción a la probabilidad y estadística. Chicago

Wackerly, D. D., Mendenhall, W., & Scheaffer, R. L. (2008). *Mathematical statistics with applications* (Vol. 7). Belmont, CA: Thomson Brooks/Cole. Chicago

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:

[X] 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:

X	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:

[X] 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: