Universida_{de}Vigo

IDENTIFYING DATA
Research methodology and statistics in physical activity and sport

Subject	Research methodology and statistics in physical activity and sport				
Code	P02G051V01110				
Study programme	Grado en Ciencias de la Actividad Física y del Deporte				
Descriptors	ECTS Credits		Choose	Year	Quadmester
	6		Basic education	1st	2nd
Teaching language	Spanish Galician				
Department					
Coordinator	Iglesias Pérez, María Carmen				
Lecturers	Iglesias Pérez, María Carmen				
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General description					

Training and Learning Results

Code	
B9	6.1 To know and understand the bases of the methodology of scientific work.
B10	6.2 Analyze, review and select the effect and effectiveness of the practice of methods, techniques and resources of research and scientific work methodology, in solving problems that require the use of creative and innovative ideas.
C22	6.2 Analyze, review and select the effect and effectiveness of the practice of methods, techniques and resources of research and scientific work methodology, in solving problems that require the use of creative and innovative ideas.
C23	6.3 Articulate and deploy with rigor and scientific attitude the justifications on which all acts, decisions, processes, procedures, actions, activities, tasks, conclusions, reports and professional performance are elaborated, supported, substantiated and justified in a constant and professional way.
D24	6.1 To know and understand the bases of the methodology of scientific work.
D25	6.2 Analyze, review and select the effect and effectiveness of the practice of methods, techniques and resources of research and scientific work methodology, in solving problems that require the use of creative and innovative ideas.
D26	6.3 Articulate and deploy with rigor and scientific attitude the justifications on which all acts, decisions, processes, procedures, actions, activities, tasks, conclusions, reports and professional performance are elaborated, supported, substantiated and justified in a constant and professional way.

Expected results from this subject

Expected results from this subject	Training and Learning Results		
To know and understand the bases of the methodology of scientific work.	B9		D24
To understand the scientific literature in the field of physical activity and sport, focusing on the method and results sections: identify the methodology used, explain the design, assess validity, differentiate the statistical methods used, correctly interpret the results.	B10	C22	D25
Know, select and apply statistical methods in solving physical activity and sport problems, in particular: select samples, organize and refine data, represent and summarize variables, quantify correlations, measure association, compare groups, calculate statistical significance , assess statistical and practical significance, draw conclusions; rigorously justify the procedures used and the conclusions reached	B10	C22 C23	D25 D26
Apply new technologies in physical activity and sports, specifically manage statistical software and Internet resources.		C22	D25

Contents

Topic	
Part 1-Introduction to scientific research in physical activity and sport. Steps and elements of the research process	1.1 The scientific method of resolution of problems. 1.2 Parts of a paper and a tesis. 1.3 Types of research: analytical, descriptive, experimental, qualitative. 1.4 Reliability and validity.
Part 2-Data analysis and applied statistics.	Lesson 2: An introduction to Statistics. One dimensional descriptive statistics. 2.1 Statistics and scientific research. 2.2 Basic concepts: population, sample, variables. 2.3 Tabulated and graphical description. 2.4 Measures of central tendency, spread, skewness, and kurtosis. Lesson 3. Two dimensional descriptive statistics. 3.1 Qualitative data analysis: contingency tables, graphical description and dependency measures. 3.2 Box-plot diagram of a variable recorded by groups. Comparison of mean and variance. 3.3 Covariance and linear correlation. 3.4 Simple linear regression model. Lesson 4: Introduction to Statistical Inference and probability models. 4.1. Introduction to statistical inference. 4.2. Probability: basic concepts. 4.3. The normal distribution. Applications. 4.4. Point estimation. The sample mean. 4.5. Calculation of the sample size. 4.6. Confidence intervals for mean and proportion Lesson 5. Testing of Hypothesis. 5.1 Definition and classical methodology of testing: types of hypothesis, associated errors, significance level, critical region. 5.2 p-value. 5.3 Statement of hypotheses and interpretation of the main tests: normality tests, chi-square test of independence, t-test for comparison of means, Pearson correlation test.
Part 3- Information and communication technologies applied to data analysis	Lesson 6: Analysis of real data with Calc and R Commander. 6.1 One-dimensional descriptive analysis. 6.2 Two-dimensional descriptive analysis. 6.3 Hypothesis Testing and Confidence Intervals.

Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	11.25	11.25	22.5
Problem solving	11.25	11.25	22.5
Practices through ICT	26	12	38
Mentored work	1	20	21
Objective questions exam	2	15	17
Presentation	2	4	6

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies

	Description
Lecturing	Professor explanation on theoretical concepts, that will have to study out of class. At the beginning of each lesson, students will be provided with material for a better comprehension of the class.
Problem solving	Resolution of exercises and activities proposed by the professor in a bulletin associated with each topic to reinforce the concepts of the master class.
Practices through ICT	Statistical software will be used for the analysis of data, mainly EXCEL, CALC and R Commander. With regard to Lesson 1, the practices will be focused on the analysis of research papers: type, schedule, hypothesis, methodologies, results and conclusions.
Mentored work	The students will make a work of analysis of data focused in the application and interpretation of the statistical concepts and models of the matter. The work will be carried out in a team group and a presentation will be made.

Personalized assistance

Methodologies	Description
Mentored work	Any questions will be resolved in the usual tutorials. Tutoring can be telematic by appointment. In the tutorials you can consult doubts about the team work or any part of the subject.

Assessment

	Description	Qualification	Training and Learning Results		
Practices through ICT	Two test (20%- 20%) about resolution/ interpretation of practical problems of statistical data analysis with software.	40	B10	C22 C23	D25
Objective questions exam	Test with objective questions and problems about concepts and models exposed and discussed in theoretical sessions.	40	B9 B10	C22 C23	D24 D25
Presentation	Evaluation of the team work. The content of the work and the presentation will be taken into account.	20	B9 B10	C22 C23	D24 D25 D26

Other comments on the Evaluation

Students can choose between a system of continuous assessment or a global assessment.
Continuous assessment is recommended.

CONTINUOUS ASSESSMENT

-First call:

Continuous evaluation consists of the following activities:
One test about concepts and problems studied in theoretical classes, two test with the computer and a group work with presentation.
In the 3 test a minimum grade of 4 (over 10) will be necessary to calculate the final average.

If a student does not work systematically in group activities, he or she may be expelled from the group.

There will also be theory self-assessment activities (optional).

-Second call:

The same structure of exams will be repeated as during the course, so that each student may retrieve the part that corresponds to him/her.

GLOBAL ASSESSMENT::

It consists of a final theory exam (50%) and a final computer exam (50%).
In each of the 2 exams, a minimum grade of 5 (over 10) will be necessary to calculate the final average.
Passed parts are not saved between first and second call.

Both in the continuous and global assesment, passed exams or parts of the subject are not saved from one course to another.

Sources of information

Basic Bibliography

Barriopedro, M.I. y Muniesa, C., **Análisis de datos en las Ciencias de la Actividad Física y del Deporte**, Pirámide, 2012

Thomas, J.R. y Nelson, J.K., **Métodos de investigación en actividad física**, Paidotribo, 2007

Gómez Ruano, M. A. y Lago Peñas, C., **Cómo ayudar a tomar decisiones en el fútbol a partir del análisis de datos**, Great Britain: los autores, 2018

Complementary Bibliography

Ortega,E. et al., **Manual de estadística aplicada a las ciencias de la actividad física y el deporte**, Murcia: DM, 2009

Sánchez Zuriaga, D. **Estadística aplicada a la fisioterapia, las ciencias del deporte y la biomecánica**, Madrid:CEU, 2011

Peña, D. y Romo, J., **Introducción a la estadística para las ciencias sociales**, McGraw_Hill, 1999

Cao, R, et al., **Introducción a la estadística y sus aplicaciones**, Pirámide, 2001

Ríus,F. el al., **Bioestadística: métodos y aplicaciones**, Universidad de Málaga, 1999

Namakforoosh, M., **Metodología de la investigación**, Limusa, 2002

Carlberg, C.G., **Análisis estadístico con Excel**, Madrid: Anaya Multimedia, 2012

Pérez López, C., **Estadística Aplicada a través de Excel**, Prentice Hall, 2002

http://knuth.uca.es/moodle/mod/resource/view.php?id=1126, **Estadística Básica con R y R-Commander**,

https://www.aulafacil.com/cursos/excel-word-powerpoint-access/open-office-calc-t296, **Curso Open Office Calc**,

https://estadisticaorquestainstrumento.wordpress.com/, **Blog de Estadística**,

Recommendations