



## IDENTIFYING DATA

### Statistics: Research methodology and statistics in physical activity and sport

Subject	Statistics: Research methodology and statistics in physical activity and sport			
Code	P02G050V01302			
Study programme	(*)Grao en Ciencias da Actividade Física e do Deporte			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Basic education	2nd	2nd
Teaching language	Spanish Galician			
Department				
Coordinator	Iglesias Pérez, María Carmen			
Lecturers	Iglesias Pérez, María Carmen Novegil Souto, José Vicente			
E-mail	mcigles@uvigo.es			
Web				
General description				

## Competencies

Code	
B2	Knowledge and comprehension of the scientific literature of the area of the physical activity and the sport.
B11	Knowledge and comprehension of the ethical beginning necessary for the correct professional exercise.
B12	Application of the technologies of the information and communication (TIC) to the area of the Sciences of the Physical Activity and of the Sport.
B13	Habits of excellence and quality in the professional exercise.
B25	Skill of leadership, capacity of interpersonal relation and teamwork.
B26	Adjustment to new situations, the resolution of problems and the autonomous learning.

## Learning outcomes

Expected results from this subject	Training and Learning Results
To understand the scientific literature in the field of Physical Activity and Sports Sciences, focusing on the statistical methods used in research studies.	
To know how to apply information and communication technologies (ICT) tools to the field of Physical Activity and Sport Sciences and, specifically, to use statistical software and Internet resources.	B12
To develop the ability of work in teams, focusing on the values of effort and respect for others, without taking advantage of others work.	B25
To develop skills for the adaptation to new situations, the resolution of problems and the self-learning.	B26
To promote principles of professional excellence and quality.	B13
To know the statistical ethical principles, regarding to seek permission to collect data sets, to keep the statistical secret and not to manipulate the report.	B11
To know the characteristics of the scientific thought: to question the intuitive ideas, to get data, to do a critical analysis of the observations, to argue and to take of decisions from rational criteria and critical thinking.	B2 B13 B26

## Contents

## Topic

Part 1. Introduction to the research methodology in Physical Activity and Sport Sciences.	<p>1.1 The scientific method of resolution of problems.</p> <p>1.2 Parts of a paper and a thesis.</p> <p>1.3 Types of research: analytical, descriptive, experimental, qualitative.</p> <p>1.4 Reliability and validity.</p>
Part 2. Data analysis and applied statistics.	<p>Lesson 2: An introduction to Statistics. One dimensional descriptive statistics.</p> <p>2.1 Statistics and scientific research.</p> <p>2.2 Basic concepts: population, sample, variables.</p> <p>2.3 Tabulated and graphical description.</p> <p>2.4 Measures of central tendency, spread, skewness, and kurtosis.</p> <p>Lesson 3. Two dimensional descriptive statistics.</p> <p>3.1 Qualitative data analysis: contingency tables, graphical description and dependency measures.</p> <p>3.2 Box-plot diagram of a variable recorded by groups. Comparison of mean and variance.</p> <p>3.3 Covariance and linear correlation.</p> <p>3.4 Simple linear regression model.</p> <p>Lesson 4. Introduction to Statistical Inference and Probability models.</p> <p>4.1. Introduction to Statistical Inference.</p> <p>4.2. Probability: basic concepts.</p> <p>4.3. Random variable.</p> <p>4.4. The Normal distribution. Applications.</p> <p>4.5. Point estimation. The sample mean.</p> <p>4.6. Calculation of the sample size.</p> <p>4.7. Confidence intervals for mean and proportion</p> <p>Lesson 5. Testing of Hypothesis.</p> <p>5.1 Definition and classical methodology of testing: types of hypothesis, associated errors, significance level, critical region.</p> <p>5.2 p-value.</p> <p>5.3 Two sample t-test</p> <p>5.4 chi-squared test of independence.</p> <p>5.5 Shapiro-Wilks test for normality.</p> <p>5.6 Pearson correlation test.</p>
Part 3. Introduction to informatics applied to statistics.	<p>Lesson 6: Analysis of real data with Calc and R Commander.</p> <p>6.1 One-dimensional descriptive analysis.</p> <p>6.2 Two-dimensional descriptive analysis.</p> <p>6.3 Hypothesis Testing and Confidence Intervals.</p>

## Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	11.25	11.25	22.5
Problem solving	11.25	11.25	22.5
Mentored work	1	24	25
Practices through ICT	26	13	39
Problem and/or exercise solving	2	15	17
Laboratory practice	4	20	24

\*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.
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 as a team work.

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.

### Personalized assistance

Methodologies	Description
Mentored work	Any doubt will be solved at the usual tutoring. Tutoring will be able to make by previous telematic means appointment. - Virtual offices of the professors in Remote Campus: José Vicente Novegil Souto: Office 1765 M <sup>a</sup> Carmen Churches Pérez: Office 1291 -Ask appointment using preferably the mail of the subject in the Faitic (teledoaching platform) -Doubts forums will be available in the Faitic
Tests	Description
Laboratory practice	Any doubt will be solved at the usual tutoring. Tutoring will be able to make by previous telematic means appointment. - Virtual offices of the professors in Remote Campus: José Vicente Novegil Souto: Office 1765 M <sup>a</sup> Carmen Churches Pérez: Office 1291 -Ask appointment using preferably the mail of the subject in the Faitic (teledoaching platform) -Doubts forums will be available in the Faitic
Problem and/or exercise solving	Any doubt will be solved at the usual tutoring. Tutoring will be able to make by previous telematic means appointment. - Virtual offices of the professors in Remote Campus: José Vicente Novegil Souto: Office 1765 M <sup>a</sup> Carmen Churches Pérez: Office 1291 -Ask appointment using preferably the mail of the subject in the Faitic (teledoaching platform) -Doubts forums will be available in the Faitic

### Assessment

	Description	Qualification	Training and Learning Results
Mentored work	Evaluation of the team work.  Each activity of group will have a grade, that will move to the components of the group according to his/her contribution. The final grade is the average (or weighted average) of all the activities.	20	B2 B11 B12 B13 B25 B26
Problem and/or exercise solving	Test with short questions and problems about concepts, models and exercises exposed and discussed in theoretical sessions.	40	B13 B26
Laboratory practice	There are, tentatively, two computer tests: 1. Descriptive analysis: Lessons 2 and 3. 2. Inference analysis: Lessons 1,4 and 5.	40	B2 B12 B13 B26

### Other comments on the Evaluation

In each of the practical parts a 5 is needed to calculate the final average.

In the theory exam a minimum grade of 4.5 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, according to a protocol established at the beginning of the course.

In the second call the same exam structure will be repeated as during the course, so that each student may retrieve the part that corresponds to him/her.

Group activities will not be retrievable in the July call.

From one course to another, passed partial exams or parts of the subject will not be kept.

### 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

#### 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, D. L., 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. et 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>,

<http://www.aulafacil.com/Excel/temario.htm>,

<https://estadisticaorquestainstrumento.wordpress.com/>,

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## Recommendations

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## Contingency plan

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### Description

=== EXCEPTIONAL MEASURES PLANNED ===

Given the uncertain and unpredictable evolution of the health alert caused by COVID-19, the University of Vigo establishes extraordinary planning that will be activated at the time that the administrations and the institution itself determine it based on safety, health and responsibility criteria, and guaranteeing teaching in a non-classroom or partially classroom setting. These already planned measures guarantee, at the required time, the development of teaching in a more agile and effective way, as it is known in advance (or well in advance) by the students and professors through the standardized tool and institutionalized teaching guides.

=== ADAPTATION OF THE METHODOLOGIES ===

-Teaching methodologies that are maintained

All teaching methodologies are maintained with synchronous classes through the Remote Campus and with the support of the Faitic teleteaching platform.

-Teaching methodologies that are modified

None

-Non-attendance mechanism for student attention (tutorials)

The tutorials may be carried out by telematic means by appointment.

- Virtual offices of professors in Remote Campus:

José Vicente Novegil Souto: Office 1765

M<sup>ª</sup> Carmen Iglesias Pérez: Office 1291

-Ask for an appointment using preferably the messaging of the subject in the Faitic (Moodle)

-Doubt forums will be enabled in the Faitic

-Modifications (if applicable) of the content to be taught

None

-Additional bibliography to facilitate self-learning

None

-Other modifications

None

=== ADAPTATION OF THE EVALUATION ===

In case of mixed or non-face-to-face teaching, a continuous assessment will be activated, with the following modifications:

[Practice exams] => [Moodle test and workshops]. Weight 40%

[Final theory exam] => [Moodle test and workshops]. Weight 40%

[Mentored work] is maintained. Weight 20%

To pass the continuous assessment, it is necessary to carry out 80% of the activities, both theory and practice, and achieve a minimum grade of 5 in each part.

-Additional Information

Students who do not meet the continuous assessment criteria will take the official first and second chance exams.

Theory tests:

It will consist of a test-type exam on concepts and exercises.

Laboratory practice tests:

It will consist of a test-type exam on the proposed practices, which the student must have done and have available at the time of the exam.

For the final exams the remote Campus and the Fatic platform will be used.

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