UNIVERSIDADE DA CORUÑA

Teaching Guide				
Identifying Data				2018/19
Subject (*)	Data Analysis in Biology		Code	610G02044
Study programme	Grao en Bioloxía			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	1st four-month period	Fourth	Optional	6
Language	Spanish			
Teaching method	Face-to-face			
Prerequisites				
Department	Matemáticas			
Coordinador	Estevez Perez, Maria Graciela	E-mail	graciela.estevez.perez@udc.es	
Lecturers	Estevez Perez, Maria Graciela Montero Manso, Pablo Vilar Fernandez, Jose Antonio	E-mail	graciela.estevez.perez@udc.es p.montero.manso@udc.es jose.vilarf@udc.es	
Web				
General description	This subject provides a first contact with advanced statistical techniques including: statistical modelling, statistical tools for data analysis, procedures to check structural assumptions on the models, and criteria to establish a critical review of the attained results, estimulating the interpretation of these results in terms of specific analyzed problem. The main objectives are: - Domain of a broad range of statistical methods in an integrated way, but emphasizing the particular properties of each of them. Specifically, the pursued targets and the required conditions for their application. - Obtaining valuable knowledge for a critical and rigorous analysis of the attained results. - Complementing the practical aspects of the learning process with the use of statistical software.			

Study programme competences / results	
Code	Study programme competences / results
A21	Deseñar modelos de procesos biolóxicos.
A26	Deseñar experimentos, obter información e interpretar os resultados.
A30	Manexar adecuadamente instrumentación científica.
B2	Resolver problemas de forma efectiva.
B3	Aplicar un pensamento crítico, lóxico e creativo.
B4	Traballar de forma autónoma con iniciativa.
B5	Traballar en colaboración.
B6	Organizar e planificar o traballo.
B10	Exercer a crítica científica.

Learning outcomes			
Learning outcomes	Study programme competences / results		
Design of experiments, acquisition of information and capability to interpret and discuss the results.	A21 A26 A30	B2 B3 B5 B6 B10	

Developing critical and creative thinking skills to address problems in an effective way.		B2 B3 B4 B5 B6 B10	

Contents	
Topic	**Sub-topic**
Simple regression models	Simple linear regression model Other regression models
Design and analysis of experiments	Basic principles. Planning experiments Basic designs with one and more than one sources of variation Complete blocks designs Designs including random effects Introduction to covariance analysis
Introduction to multivariate analysis	Description of multivariate data Principal component analysis Multivariate analysis of variance Discriminant analysis Cluster analysis

Planning				
Methodologies / tests	**Competencies / Results**	**Teaching hours (in-person & virtual)**	**Student?s personal work hours**	**Total hours**
Supervised projects	A21 A26 A30 B2 B3 B4 B5 B6 B10	4	10	14
ICT practicals	A26 A30 B2 B3 B10	14	23.8	37.8
Problem solving	A26 B2 B3 B5 B10	5	9	14
Guest lecture / keynote speech	A26 B2 B3 B6 B10	24	55.2	79.2
Objective test	A21 A26 A30 B2 B3 B4 B6 B10	3	0	3
Personalized attention		2	0	2
(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.				

Methodologies	
Methodologies	**Description**
Supervised projects	Students should develop one or two practical works related to the subject contents. These works could be defended during a pre-established seminar.
ICT practicals	Practical classes in the computer lab conducted to provide some knowledge on the use of statistical software (mainly the R-commander package). These classes are specifically designed to learn the elementary use of the package and to interpret its outputs. Use of software helps to focus attention on the statistical issues rather than on the calculation.
Problem solving	Solving real problems in order to use statistical techniques fluently, empashizing their practical application.
Guest lecture / keynote speech	Lectures where the basic theoretical principles of the subject are presented together with properly illustrated practical examples.
Objective test	Final exam on the theoretical and practical contents of the subject. This exam consists in answering a list of short questions and/or solving some longer exercises in a reasoned way.

Personalized attention

Methodologies	Description
Supervised projects	There will be personalized advice sessions during the development of the practical works. These sessions will take place by means of the interaction teacher/students at the moment of solving the different activities suggested in class: solving doubts, correcting mistakes, suggesting proper approaches to deal with the proposed problems and reviewing initial versions of the works. Also in class when the students proceed to the defense of their works. In addition, students will have the opportunity of receiving personalized advice in the office of the teachers. Personalize advice may be also received via online, by means of e-mail, virtual platform,... Part-time students are not required to defend their works in class, but these works must be provided to the teachers for their assessment. Part-time students can also receive personalized assistance using both face-to-face and virtual approaches.

Assessment			
Methodologies	Competencies / Results	Description	**Qualification**
Supervised projects	A21 A26 A30 B2 B3 B4 B5 B6 B10	Application of several statistical techniques to practical cases.	50
Objective test	A21 A26 A30 B2 B3 B4 B6 B10	Test for assessment of knowledge.	50

Assessment comments
Ongoing monitoring of attendance and ongoing assessment of knowledge acquisition by checking lists of solved problems and the learning level shown during the seminars. Requirements to pass the subject are: (i) passing the official exam and (ii) performing one or two practical works where the studied statistical techniques will be used to deal with specific practical problems. Scores attained with these works are saved and valid throughout the course. These requirements hold for both opportunities (January and July). Whether the practical works are not carried out in January, they must be performed in July. This also applies to the part-time students. The official exams of both opportunities (January and July) consist in answering a list of short and conceptual questions about application and interpretation of the studied statistical methods. To pass the official exam in January or July is required to pass the two aforementioned tests. If both tests are passed, then the final score could be increased up to 1 point (considering a total maximum score of 10 points) according to the results of the ongoing assessment for the student. If the practical works are not presented in due course and the official exams are not carried out, then the specific mark "NON PRESENTADO" will be given. All previous observations are applicable to part-time students.

Sources of information	
Basic	
Complementary	

Recommendations
Subjects that it is recommended to have taken before
Statistics/610G02005
Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
Other comments

1- Attendance and participation in both theoretical and practical lectures.
2- Complete all the problems solved in the development of the classes, with and without help of the statistical software.3- Complement the material provided by teachers using the recommended references.
4- Ongoing review of the work done in class by solving questionnaires and lists of proposed problems. 5- Active participation in seminars scheduled for presentation and defense of practical works.6- Regular use of statistical software.7- Application of statistical techniques to address problems arising in other subjects.
8- Take advantage of a regular participation in the personalized tutorial sessions.