Teaching Guide				
Identifying Data				2021/22
Subject (*)	Survival Analysis and Diagnostic Tests		Code	6538623033
Study programme	Mestrado Universitario en Asistencia e Investigación Sanitaria (plan 2012)			
Descriptors				
Cycle	Period	Year	Type	Credits
Official Master's Degree	2nd four-month period	First	Optional	3
Language	SpanishGalician			
Teaching method	Non-attendance			
Prerequisites				
Department	Ciencias da SaúdeMatemáticas			
Coordinador	Pértega Díaz, Sonia	E-mail	s.pertega@udc.es	
Lecturers	Jacome Pumar, Maria Amalia Pértega Díaz, Sonia	E-mail	maria.amalia.jacome@udc.es s.pertega@udc.es	
Web				
General description	This subject has got two distinct blocks: Survival Analysis (2 ETCs) and Diagnostic Tests (1 ECT). The common purpose is to establish the methodological elements that the student needs to design, carry out and understand clinical-epidemiological studies in the field of Health Sciences that involve survival analysis or the evaluation of diagnostic tests			
Contingency plan	MODIFICATIONS IN THE CONTENTS - No changes METHODOLOGIES: No changes, as the proposed methodologies will be applied online using TEAMS and the website campusvirtual.udc.es MEHCANISMS FOR PERSONALIZED ATTENTION TO STUDENTS - e-mail: Daily, to make queries, ask for tutorial sessions and for the follow-up of the practical projects. - Campus virtual: Daily. - Teams MODIFICATIONS IN THE ASSESSMENT No changes MODIFICATIONS TO THE BIBLIOGRAPHY OR WEBGRAPHY: No changes			

Study programme competences	
Code	Study programme competences
A1	Capacidade para elixir e aplicar as metodoloxías de investigación mais adecuadas á investigación proposta.
A4	Obter un substrato teórico suficiente para comprender o entorno clínico de aplicación das técnicas de investigación.
A5	Adquirir o coñecemento da realidade investigadora nun ámbito concreto das ciencias da saúde.
B1	Capacidade para aplicar o método científico na planificación e o desenvolvemento da investigación sanitaria.
B2	Fluidez e propiedade na comunicación científica oral e escrita.
B3	Compromiso pola calidade do desenvolvemento da actividade investigadora.
B4	Capacidade de análise e de síntese.
B5	Habilidade para manexar distintas fontes de información.
B6	Capacidade para traballar de forma colaborativa en equipos multi e interdisciplinar.
B7	Capacidade de establecer unha relación de empatía cos suxeitos implicados no desenvolvemento da actividade investigadora.
C1	Expresarse correctamente, tanto de forma oral coma escrita, nas linguas oficiais da comunidade autónoma.
C3	Utilizar as ferramentas básicas das tecnoloxías da información e as comunicacións (TIC) necesarias para o exercicio da súa profesión e para a aprendizaxe ao longo da súa vida.

C8	Valorar a importancia que ten a investigación, a innovación e o desenvolvemento tecnolóxico no avance socioeconómico e cultural da sociedade.

Learning outcomes			
Learning outcomes	Study programme competences		
Skills to know and apply specific analysis tools to analyze the validity and reliability of the results of diagnostic tests in clinical practice.	AR1 AR4 AR5	BC1 BC2 BC3 BC4 BC5 BC6 BC7	CC1 CC3 CC8
Skills to use the correct statistical procedures in a clinical research study.	AR1 AR4 AR5	BC1 BC2 BC3 BC4 BC5 BC6 BC7	CC1 CC3 CC8

Contents	
Topic	Sub-topic
BLOCK 1. Survival Analysis	1.1. Introduction: types of censoring, main functions of interest. 1.2. Estimation of the survival curve: Kaplan-Meier estimator, important parametric models. 1.3. Comparison of survival curves 1.4. The proportional hazards model: Cox regression model. 1.5. The competing risk model.
BLOCK 2. Diagnostic test	2.1. Validity and reliability of a diagnostic test: sensitivity, specificity, predictive values, likelihood ratios. 2.2. Clinical implementation of Bayes's Theorem. 2.3. ROC curves and the area under the ROC curve.
PRACTICAL CONTENT	1. Choice of the appropriate technique for data analysis, application of methods with statistical software, and interpretation of results. 2. Application of epidemiological software for the analysis of the validity and reliability of diagnostic tests. 3. Interpretation of results in the evaluation of diagnostic tests

Planning				
Methodologies / tests	Competencies	Ordinary class hours	Student?s personal work hours	Total hours
Online forum	A1 A4 A5 B1 B2 B3 B4 B5 B6 B7 C1 C3 C8	0	1	1
ICT practicals	A1 A5 B1 B3 B4 B5 B6 C3	0	15	15
Problem solving	A1 A5 B1 B2 B3 B4 B5 B6 C8 C3	0	12	12

Supervised projects	A1 A5 B1 B2 B3 B4 B5 B6 B7 C1 C3 C8	0	15	15
Guest lecture / keynote speech	A1 A4 A5 B1 B2 B3 B4 B5 B6 B7 C1 C3 C8	0	24	24
Multiple-choice questions	A1 A4 A5 B1 B2 B3 B4 B5 B6 B7 C1 C3 C8	0	1	1
Case study	A1 A5 B1 B2 B3 B4 B5 B6 B7 C1 C3 C8	0	7	7
Personalized attention		0		0
(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.				

Methodologies	
Methodologies	**Description**
Online forum	Espazo de discusión informal destinado aos estudantes para o tratamento dun tema ou problema, que se desenvolverá a través dun contorno virtual de aprendizaxe mediante ferramentas de comunicación asíncrona (foro).
ICT practicals	Actividades prácticas que consistirán na aplicación dos contidos teóricos da materia mediante a utilización das tecnoloxías da información e as comunicacións. Empregarase software específico para a realización de estudos bioestatísticos ou epidemiolóxicos.
Problem solving	Plantexarase a resolución de situacións prácticas concretas, a partir dos coñecementos traballados na materia
Supervised projects	Traballos onde se reflicta o dominio teórico-metodolóxico da materia. Os traballos solicitaranse en formato virtual e soporte informático.
Guest lecture / keynote speech	Estudio dirixido a través de material multimedia, baseado na exposición dos coñecementos teóricos da materia apoiandose no uso de medios audiovisuais
Multiple-choice questions	Cuestionarios de preguntas tipo test e/ou preguntas curtas co propósito de controlar a evolución na materia
Case study	Exposición dunha situación específica que suscita un problema que ten que ser comprendido, valorado e resolto por os/as alumnos/as. Plantexaranse problemas concretos en relación cos contidos da materia que describan unha situación real e describirase o proceso de resolución.

Personalized attention	
Methodologies	**Description**
Case study Online forum ICT practicals Problem solving Supervised projects	The personalized attention related to these methodologies aims to guide students in the study of the subject and in the realization of the proposed practical works. The follow-up will be done individually or in small groups, telematically, through email, the Virtual Campus or Teams.

Assessment			
Methodologies	**Competencies**	**Description**	**Qualification**
Multiple-choice questions	A1 A4 A5 B1 B2 B3 B4 B5 B6 B7 C1 C3 C8	Multiple choice and short answer questions to assess the progress for each unit of the subject.	30
Problem solving	A1 A5 B1 B2 B3 B4 B5 B6 C8 C3	Concrete practical situations, that will have to be solved using the contents introduced in the subject	30
Supervised projects	A1 A5 B1 B2 B3 B4 B5 B6 B7 C1 C3 C8	Application of several statistical techniques to practical cases.	40

Assessment comments
Assessment system The subject is divided into two blocks: Block 1 (corresponding to Unit 1. Survival analysis) and Block 2 (corresponding to Unit 2. Diagnostic tests). Both blocks are independent, that is, one block's qualification is not affected by the other block's qualification. To pass the subject, it is necessary to pass both blocks separately. In that case, the final score will be the weighted sum of each block's qualification. In case of failing at least one block, the final score will be the minimum between the weighted sum of each block's qualification and the score 4.5 The final mark will be "ABSENT" (NP) only in the case the student carried out none of the assessment activities. Concerning students of previous academic courses, the different former marks will not be kept in the current academic course. Block I (Unit 1. Survival Analysis) The highest score is 6.5 (out of 10), which comes from: Continuous evaluation (2.5 out of 10), consisting of solving problems and multiple-choice questions to be answered online individually. A supervised project (4 out of 10), which includes the application of several statistical techniques to practical cases. It can be individual or in groups of 2-3 people.Block II (Unit 2. Diagnostic test) The highest score is 3.5 (out of 10), which comes from: Continuous evaluation (1.75 out of 10), consisting of solving problems and/or multiple-choice questions related to the contents, to be answered online individually. Multiple-choice questions (1.75 out of 10), related to the contents, to be answered online individually. This assessment system will be applied in both the first and second call.December call The regulation in the " Assessment, review and complaint regulation of degrees and master studies of the UDC ", article 19, shall apply. High honors qualification (MH) Students whose final qualification exceeds 9 may be eligible for honors. The teachers of the subject may consider additional criteria in the results obtained by the students in any of the training actions programmed in the teaching guide. Fraud Fraud in tests or evaluation activities will directly involve the implementation of the current rules in the Assessment, review and complaint regulation of the UDC and the Student Statute of the UDC All these remarks are applied to the part-time students and/or with academic exemption.

Sources of information	
Basic	- Clark, T., Bradburn, M., Love, S. et al. (2003). Survival Analysis Part I: Basic concepts and first analyses.. Br J Cancer 89, 232?238 (2003). https://doi.org/10.1038/sj.bjc.6601118 (https://www.nature.com/artic - Collet D (2015). Modelling survival data in medical research. London: Chapman & Hall; - Lee ET, Wang JW (2003). Satistical Methods for suvirval data analysis.. 3rd. ed. Belmont, CA: Lifetime learning Publications - Hosmer, D.W. y Lemeshow, S. (1999). Applied Survival Analysis: Regression Modeling of Time to Event Data.. N.Y.: John Wiley & Sons, Inc. - Pepe, M. S. (2003). The statistical evaluation of medical tests for classification and prediction. Oxford: Oxford University Press. - Pita Fernández, S., Pértega Díaz, S. (2003). Pruebas diagnósticas: Sensibilidad y especificidad.. Cad Aten Primaria 2003; 10: 120-124. - López de Ullibarri Galparsoro I, Píta Fernández, S. (1998). Curvas ROC. CAD ATEN PRIMARIA 1998; 5 (4): 229-235.
Complementary	- Pita Fernández, S (2001). Análisis de supervivencia. CAD ATEN PRIMARIA 1995; 2: 130-135. https://www.fisterra.com/mbe/investiga/supervivencia/supervivenc - SEH-LELHA (2021). Artículos de Bioestadística . https://www.seh-lelha.org/bioestadistica/ - Unidade de Bioestadística Clínica del Hospital Universitario Ramón y Cajal (2021). Material docente. http://www.hrc.es/bioest/M_docente.html

Recommendations
Subjects that it is recommended to have taken before

Statistics Applied to Health Sciences/653862206 Statistical Models for Clinical Research/6538623028 Statistics Applied to Health Sciences/6538623005
Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
Other comments
Teaching use of English: It is advisable a basic knowledge of English for reviewing the available sources of information, althought it is not mandatory. The recommended level of English is A2, as stated in the Common European Framework of Reference on Language Skills (http://cvc.cervantes.es/ensenanza/biblioteca_ele/marco/cvc_mer.pdf).

(*)The teaching guide is the document in which the URV publishes the information about all its courses. It is a public document and cannot be modified. Only in exceptional cases can it be revised by the competent agent or duly revised so that it is in line with current legislation.