Teaching Guide					
Identifying Data					2024/25
Subject (*)	Metric Studies of Information			Code	710G04027
Study programme	Grao en Xestión Dixital de Información e Documentación				
Descriptors					
Cycle	Period	Year		Type	Credits
Graduate	1st four-month period	Third		Obligatory	6
Language	Spanish				
Teaching method	Face-to-face				
Prerequisites					
Department	HumanidadesMatemáticas				
Coordinador	Alfaya Lamas, Elena		E-mail	elena.alfaya@udc.es	
Lecturers	Alfaya Lamas, Elena Pena Álvarez, María Tarrio Saavedra, Javier		E-mail	elena.alfaya@udc.es m.pena1@udc.es javier.tarrio@udc.es	
Web					
General description	This subject provides to the students the knowledge and tools for the study of information from a statistical, quantitative perspective, including those concepts and techniques related to scientometrics, bibliometrics and altmetrics.				

Study programme competences / results	
Code	Study programme competences / results
A1	CE1 - Know and understand the theoretical and methodological principles of information and documentation management to apply them in their professional activity
A8	CE8 - Master the different methods of representation of data, information and knowledge that ensure efficient recovery
A13	CE13 - Know and master the techniques and regulations for the creation and authentication, meeting, selection, organization, representation, preservation, recovery, access, dissemination and exchange, and evaluation of resources and information services
A16	CE16 - Master and use criteria and indicators for the evaluation of products and services of information including metrics and qualitative studies
A20	CE20 - Master the bases to develop research activities using multidisciplinary methods and principles
A21	CE21 - Possess knowledge of statistics and quantitative analysis of information
A22	CE22 - Acquire computational skills and management of new ICT
B1	CB1 - Possess and understand knowledge that provides a basis or opportunity to be original in the development and / or application of ideas, often in a research context
B2	CB2 - Apply the knowledge acquired and their ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study
B3	CB3 - Be able to integrate knowledge and face the complexity of making judgments based on information that, being incomplete or limited, includes reflections on social and ethical responsibilities linked to the application of their knowledge and judgments
B4	CB4 - Know how to communicate their conclusions -and the knowledge and ultimate reasons that sustain them- to specialized and non-specialized audiences in a clear and unambiguous way
B5	CB5 - Possess the learning skills that allow them to continue studying in a way that will be largely self-directed or autonomous
B6	CG1 - Capacity for cooperation, teamwork and collaborative learning
B7	CG2 - Capacity for reflection and critical reasoning
B8	CG3 - Capacity for planning, organization and management of resources, information and operations
B9	CG4 - Capacity for analysis, diagnosis and decision making
B10	CG5 - Ability to work in an international and global context
B11	CG6 - Ability to understand the importance, value and function of the Digital Information and Documentation Management in the current ICT society
C1	CT1 - Express correctly, both orally and in writing, in the official languages ??of the autonomous community
C2	CT2 - Use the basic tools of information and communication technologies (ICT) necessary for the exercise of their profession and for learning throughout their lives

C3	CT3 - Develop oneself for the exercise of a citizenship that respects democratic culture, human rights and the gender perspective
C4	CT4 - Understand the importance of the entrepreneurial culture and know the means available to entrepreneurs
C5	CT5 - Acquire skills for life and habits, routines and healthy lifestyles
C6	CT6 - Develop the ability to work in interdisciplinary or transdisciplinary teams, to offer proposals that contribute to a sustainable environmental, economic, political and social development
C7	CT7 - Assess the importance of research, innovation and technological development in the socio-economic and cultural progress of society
C8	CT8 - Have the ability to manage time and resources: develop plans, prioritize activities, identify criticisms, establish deadlines and comply with them

Learning outcomes			
Learning outcomes	Study programme competences / results		
To know the main concepts, aspects and characteristics of bibliometrics, scientometrics, informetrics and altmetrics.	A1 A21	B1 B5 B7	C1 C3 C4 C5 C7
To know and know how to handle the main bibliometric databases such as Scopus and Web of Science, including all the quantitative data analysis tools provided by their web platforms.	A1 A8 A13 A16 A20 A21 A22	B2 B9 B11	C2 C4 C6 C7
Know, understand and know how to apply the main bibliometric indicators, cybernetic, scientometrics, and other quantitative tools and representation of citation analysis.	A1 A8 A13 A16 A20	B1 B2 B3 B7 B9	C1 C8
To know the main rankings in the field of bibliometrics, to understand how they are constructed and to know how to interpret their quantitative indicators.	A1 A16 A20 A21 A22	B1 B7 B9 B11	C2 C4 C6 C7 C8
Knowledge and acquisition of skills for data collection, data processing and the application of different statistical techniques in bibliometrics, scientometrics, informetrics and altmetrics, including, among others, exploratory methods, regression, inference, quality control and network analysis.	A1 A8 A16 A20 A21 A22	B1 B2 B3 B4 B5 B7 B9	C1 C2 C4 C7 C8
Ability to apply and develop data visualization tools, including graphical network analysis techniques.	A8 A16 A21 A22	B2 B4 B6 B9 B10 B11	C2 C6 C7 C8

Ability to use computational tools for statistical data analysis.	A8 A21 A22	B2 B3 B4 B5 B8 B9 B10 B11	C2 C4 C6 C7 C8
Integrate theoretical and practical statistical knowledge as a way to adquire knowledge and reflective and totalizing thinking.	A16 A21	B1 B2 B3 B4 B6 B7 B8 B9 B10	C1 C4 C6 C7 C8
Capability of analysis and synthesis applied to the management and organization of information.	A8 A13 A20	B3 B4 B5 B7 B8 B9	C1 C4 C6 C7 C8

Contents	
Topic	**Sub-topic**
Introduction to information metric studies.	Preliminary concepts, historical evolution, objectives and relevance. Informetrics, Bibliometrics, Scientometrics and Altmetrics.
Sources of bibliometric information.	Web of Science and the Journal Citation Report. Scopus. Google Scholar. Other sources of bibliometric information. Case studies.
Informatics indicators and software for statistical analysis.	Indicators calculated from the number of publications and/or citations, journal indicators, patent indicators, webometric indicators, economic indicators, indicators of the reputation of institutions and researchers, indicators of scientific collaboration. Software for statistical analysis in Bibliometrics, Scientometrics, Informetrics and Altmetrics. Case studies.
Metric studies in historical-archival documentation	Introduction. Case studies.
Multivariate statistical methods for analysis in Bibliometrics, Scientometrics, Informetrics and Altmetrics.	Descriptive statistical analysis in Bibliometrics, Scientometrics, Informetrics and Altmetrics. Study of the relationship between bibliometric variables. Correspondence analysis. Cluster analysis in Informetrics. Introduction to network analysis and scientific maps. Case studies with R.

Rankings of higher education institutions.	Introduction and objectives. National rankings. International rankings. Case studies with R.
Bibliometric laws and estimation of regression models	Preliminary concepts. Regression model fitting. Bibliometric laws: Price, Lotka, Zipf. Case studies with R.
Statistical quality control in libraries, science and information systems.	Library databases. Six Sigma methodology. Basic tools of statistical quality control. Practical cases with R.

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Guest lecture / keynote speech	A1 A8 A16 A20 A21 B1 B3 B7 C4 C7	21	0	21
ICT practicals	A13 A16 A20 A22 B10 B11 C2	17	0	17
Case study	A1 A8 A16 A20 A21 B2 B3 B4 B5 B6 B7 B8 B9 C1 C8	10	10	20
Supervised projects	B2 B4 B5 B6 B8 B9 B10 C1 C3 C5 C6 C8	1	88	89
Objective test	A21 B1 B2	2	0	2
Personalized attention		1	0	1
(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.				

Methodologies	
Methodologies	Description
Guest lecture / keynote speech	They will be expository sessions in which the various topics of the subject will be introduced and described through presentations (using appropriate audiovisual media) that will include theory and examples.
ICT practicals	Practical classes will be developed using statistical software. Its programming and application will be introduced based on real and simulated cases.
Case study	The bibliometric and statistical techniques taught in the subject will be applied to solve exercises and real and simulated case studies in the field of informetrics.
Supervised projects	Individual and/or group works will be carried out under the supervision of the teachers of the subject. These assignments may deal with the resolution of practical exercises or specific case studies related to the field of computer science. For this purpose, bibliometric and, in general, statistical techniques may be applied, using specific quantitative analysis software such as the R package, in addition to qualitative analysis. A review study on a specific topic of the subject or in relation to the software used may also be carried out. The works can be proposed by the teachers or by the students themselves (the proposals will be taken into account or not always according to the teacher's criteria).
Objective test	It will consist of a multiple-choice test on the contents taught in the subject, which, optionally, may contain questions to be developed in writing.

Personalized attention	
Methodologies	Description

ICT practicals Guest lecture / keynote speech Supervised projects	In the master classes, discussion among the students and between the students and the teacher will be encouraged at all times. For the resolution of problems it will be important to attend personally to the students in case of possible doubts that may arise. This attention will also serve, on the one hand, to the teacher to detect possible problems in the methodology used to teach the subject and, on the other hand, to the students to consolidate theoretical knowledge and to express their concerns about the subject. It will also be essential to give personalized attention to the student during the ICT practical classes, especially until he/she becomes familiar with the software to be used, as well as in the resolution of case studies.

Assessment			
Methodologies	Competencies / Results	Description	Qualification
ICT practicals	A13 A16 A20 A22 B10 B11 C2	Attendance and/or performance of the students in the practical classes with the statistical software will be evaluated.	20
Supervised projects	B2 B4 B5 B6 B8 B9 B10 C1 C3 C5 C6 C8	Individual and/or group work will be carried out under the supervision of the teachers of the subject. These works may include the resolution of practical exercises or specific case studies related to the field of Informetrics. For this purpose, bibliometric and, in general, statistical techniques may be applied, using specific quantitative analysis software such as the R package, in addition to qualitative analysis. A review study on a specific topic of the subject or in relation to the software used may also be carried out. The work may be proposed by the teachers or by the students themselves (the proposals will be taken into account or not always according to the teacher's criteria).	40
Objective test	A21 B1 B2	A multiple-choice test that, optionally, may contain some questions to be developed in writing.	40

Assessment comments
Primeira oportunidade Realizarase unha proba de resposta múltiple de 10 a 20 preguntas que representa o 40% da nota (opcionalmente, poderanse incluir preguntas a desenvolver por escrito), sendo preciso obter como mínimo un 3.5 sobre 10 na proba obxectiva para aplicar esta ponderación. Por outra banda, a avaliación continua constará da asistencia e/ou entrega de prácticas relacionadas coa aprendizaxe e aplicación do software para a resolución de problemas no campo da Informetría (20% da nota global), ademais da entrega dun ou varios traballos de aplicación de técnicas bibliométricas e, en xeral, estatísticas, para a resolución de casos de estudo en Informetría (alternativamente poderán ser traballos de revisión ou ampliación da materia) que representa o 40% da nota total. Segunda oportunidade Na avaliación da segunda oportunidade se seguirá o mesmo criterio que na primeira. Convocatoria adiantada Todas as observación previas son aplicables aos estudantes que soliciten a convocatoria adiantada do exame. Calificación de non presentado En calquera das dúas oportunidades anuais figurará un NON PRESENTADO naqueles casos nos que o alumnado non acuda ó exame oficial da materia. Estudiante con recoñecemento de dedicación a tempo parcial e dispensa académica de exención de asistencia No caso do alumnado con recoñecemento de dedicación a tempo parcial e dispensa académica de exención de asistencia que decida non asistir a clases, este será avaliado nas dúas oportunidades como o resto do alumnado que se atopa nunha situación similar. Plaxio nas probas e actividades A realización fraudulenta das probas ou actividades de avaliación implicará directamente a calificación de suspenso "0" na materia na convocatoria correspondente, invalidando así calquera calificación obtida en todas as actividades de avaliación de cara á convocatoria extraordinaria.

Sources of information	
Basic	- Roemer, R. C., & Borchardt, R. (2015). Meaningful metrics: A 21st century librarian's guide to bibliometrics, altmetrics, and research impact. Association of College and Research Libraries - Qiu, J., Zhao, R., Yang, S., & Dong, K. (2017). Informetrics: theory, methods and applications.. Springer - Moed, H. F. (2017). Applied evaluative informetrics. Berlin: Springer International Publishing - Tarrío-Saavedra, J., Orois, E., & Naya, S. (2017). Estudio métrico sobre la actividad investigadora usando el software libre R: el caso del sistema universitario gallego. Investigación bibliotecológica, 31(SPE), 221-247 - Williams, G. (2011). Data mining with Rattle and R: The art of excavating data for knowledge discovery. Springer Science & Business Media - Fernández Casal, R., Lafuente Rego, B., Lombardía, M.J., Costa, J. & Tarrío-Saavedra, J. (2020). scimetr: paquete en R para el análisis bibliométrico. https://rubenfcasal.github.io/scimetr/articles/docs/R_packages.html - Dervi?, H. (2019). Bibliometric analysis using Bibliometrix an R Package. Journal of Scientometric Research, 8(3), 156-160
Complementary	

Recommendations
Subjects that it is recommended to have taken before
Data Science/710G04026 Fundamentals of Statistics/710G04040
Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
Other comments
To help to achieve a sustainable environment and meet the objective of action number 5: ?Healthy and sustainable environmental and social teaching and research? of the "Green Campus Ferrol Action Plan":1.- The delivery of the documentary works carried out in this subject:1.1. It will be requested in virtual format and/or computer support.1.2. It will be done through Moodle, in digital format without the need to print them.1.3. If done on paper:-Plastics will not be used.- Double-sided prints will be made.- Recycled paper will be used.- Draft printing will be avoided.2.- A sustainable use of resources and the prevention of negative impacts on the natural environment must be made.3.- The importance of ethical principles related to the values ??of sustainability in personal and professional behavior must be taken into account.4.- As it is included in the different regulations of application for university teaching, the gender perspective must be incorporated in this subject (non-sexist language will be used, bibliography of authors of both sexes will be used, intervention in student class will be encouraged and students...).5.- We will work to identify and modify prejudices and sexist attitudes, and the environment will be influenced to modify them and promote values ??of respect and equality.6. Situations of discrimination based on gender must be detected and actions and measures will be proposed to correct them.7. The full integration of students who, due to physical, sensorial, psychic or sociocultural reasons, experience difficulties in an ideal, egalitarian and profitable access to university life will be facilitated