Teaching Guide				
Identifying Data				2020/21
Subject (*)	Methodology of the Scientific Research		Code	770523006
Study programme	Mestrado Universitario en Eficiencia e Aproveitamento Enerxético			
Descriptors				
Cycle	Period	Year	Type	Credits
Official Master's Degree	1st four-month period	First	Optional	3
Language	SpanishGalicianEnglish			
Teaching method	Hybrid			
Prerequisites				
Department	Ciencias da Computación e Tecnoloxías da InformaciónComputaciónEnxeñaría Industrial			
Coordinador	Sanchez Maroño, Noelia	E-mail	noelia.sanchez@udc.es	
Lecturers	Calvo Rolle, Jose Luis Sanchez Maroño, Noelia	E-mail	jose.rolle@udc.es noelia.sanchez@udc.es	
Web	moodle.udc.es/			
General description	The aim of this course is to provide an overview of the world of research. The knowledge taught allow students to know the context related theoretical and applied research work and acquire some basic skills to find quality information, writing and presenting research results.			
Contingency plan	1. Modifications to the contents No modifications to the contents are considered. 2. Methodologies All teaching methodologies are maintained, only the way of use change: the lectures will be carried out, preferably, synchronously through Teams in the time intervals assigned in the official calendar. These synchronous sessions can be combined with digitalized material (videos, presentations, etc.). In addition, if necessary, they can be recorded and made available to students through the Moodle platform. The presentation of the students of the tutored works will also be done through the Teams platform at the assigned class times although tutoring hours could be used. 3. Mechanisms for personalized attention to students They will be the same as those enabled under normal conditions. 4. Modifications in the evaluation The evaluation conditions will not change 5. Modifications to the bibliography or webgraphy Not considered			

Study programme competences / results	
Code	Study programme competences / results
B3	Poseer y comprender conocimientos que aporten una base u oportunidad de ser originales en el desarrollo y/o aplicación de ideas, a menudo en un contexto de investigación.
B7	Desarrollar las capacidades de análisis y síntesis; fomentar la discusión crítica, la defensa de argumentos y la toma de conclusiones.
B10	Potenciar la creatividad.
C1	Adquirir la terminología y nomenclatura científico-técnica para exponer argumentos y fundamentar conclusiones.
C4	Desarrollar el pensamiento crítico

Learning outcomes			
Learning outcomes	Study programme competences / results		
An overview of research at the university level, deepening the main lines in the field of engineering.		BC3	CC1

Knowing the work of management in research, especially in relation to applications for research projects in various fields.		BC7	
Know the main forum for scientific discussion and its normal operation regarding abstract submission, review, etc.		BC3	
Search for quality scientific and technical references in various sources.			CC1
Write articles with scientific and technical nature and present them properly.		BC10	CC4
Knowing what is expected of a doctoral dissertation, how is written and how it is presented.		BC10	CC1 CC4

Contents	
Topic	**Sub-topic**
1. Scientific and technological research	1.1. The research concept. 1.2. Taxonomy of research. 1.3. Characteristics of scientific research. 1.4. Ethical aspects of research.
2. The research methodology.	2.1. Steps of the research process. 2.2. Main research methods.
3. The dissemination of research.	3.1. Types of publications. 3.2. Patents.
4. Management and search of scientific and technical references.	4.1. Information sources. 4.2. How to literature searches. 4.3. Tools for finding references. 4.4. Tools for managing references. 4.5. Introduction to citation indexes.
5. Drafting and presentation of scientific papers in the field of engineering.	5.1. Basic resources for scientific work. 5.2. The structure of a scientific paper. 5.3. Techniques for writing scientific papers. 5.4. Preparation of presentations of scientific papers.
6. Research projects and innovation.	6.1. Conception and planning of a research project. 6.2. essential elements of a research project. 6.3. Types of calls for research projects and innovation.
7. Development of a doctoral thesis.	7.1. What is a doctoral thesis?. 7.2. Selecting a new line or research problem.
8. Transfer of knowledge to industry and exploitation of results.	8.1. Patent licensing. 8.2. Creation of technology-based companies: spin-off. 8.3. Contract research and cooperative.

Planning				
Methodologies / tests	**Competencies / Results**	**Teaching hours (in-person & virtual)**	**Student?s personal work hours**	**Total hours**
Guest lecture / keynote speech	B3 C1	9	9	18
Supervised projects	B7 B10 C4	8	40	48
Oral presentation	B7 C4	1.5	1.5	3
Mixed objective/subjective test	B3 C1	1.5	1.5	3
Objective test	B3 B7 C4	3	0	3
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	Oral presentation complemented with the use of audiovisual media and the introduction of some questions to students, in order to transmit knowledge and facilitate learning.

Supervised projects	Development work on writing scientific articles, presentations at scientific-technical work and preparation of reports of research projects.
Oral presentation	For some supervised project, students should prepare an oral presentation where they present their work in the classroom, highlighting the main contributions and conclusions.
Mixed objective/subjective test	Realization of short questionnaires to see if knowledge of a specific topic has been acquired
Objective test	It will consist of theoretical and practical on any of the items included in the agenda of the current issues.

Personalized attention	
Methodologies	**Description**
Supervised projects	Student advice and assistance in tasks that require personal attention and resolution of doubts in their development will take place. Apart from teaching hours, attention is maintained in the official tutoring hours through the following channels: - Email: Of use to make short answer queries. - Teams: virtual meetings preferably upon request via email.

Assessment			
Methodologies	**Competencies / Results**	**Description**	**Qualification**
Supervised projects	B7 B10 C4	Realization of the tasks, in time and form, established in the matter within the framework of this methodology. To pass the subject is essential to have made and approved the "supervised projects". As part of the "supervised project" issues such as school attendance, personal work, proposed personal work, attitude, etc., to help obtaining approved will be included.	40
Oral presentation	B7 C4	It would be included in some supervised project and it would affect the final grade of the project, however it is not graded on its own.	0
Mixed objective/subjective test	B3 C1	Realización dos cuestionarios, en tempo e forma, establecidas na materia no marco desta metodoloxía.	10
Objective test	B3 B7 C4	Objective exam. It is necessary to exceed 50% of the score in the objective test to pass the subject.	50

Assessment comments
For the second opportunity, students may resubmit those "supervised projects" not presented during the course, in any case it is possible to submit any project to obtain a better grade. If the project requires oral presentation, it will be done the same day of the objective test.To help achieve a sustainable immediate environment and meet the objective of action number 5: "Teaching and research healthy and sustainable environmental and social" of the "Plan of Action Green Campus Ferrol": 1.- The delivery of the documentary works that are carried out in this subject:1.1. It will be requested in virtual format and / or computer support1.2. It will be done through Moodle, in digital format without needing to print them1.3. To be made on paper:- Plastics will not be used.- Two-sided prints will be made.- Recycled paper will be used.- Drafts print will be avoided.

Sources of information	
Basic	- José Cegarra Sánchez (2013). Metodología de la investigación científica y tecnológica. Ediciones Díaz de Santos - Roberto Hernandez-Sampieri (2014). Metodología de la investigación (6ª Edición). McGraw-Hill - Michael Jay Katz (2009). From Research to Manuscript: A Guide to Scientific Writing (2ª edición). Springer
Complementary	

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

(*)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.