Teaching Guide				
Identifying Data				2022/23
Subject (*)	Fundamentals of Computing Science		Code	610G04010
Study programme	Grao en Nanociencia e Nanotecnoloxía			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	2nd four-month period	First	Basic training	6
Language	Spanish			
Teaching method	Face-to-face			
Prerequisites				
Department	Ciencias da Computación e Tecnoloxías da Información			
Coordinador	Eiras Franco, Carlos	E-mail	carlos.eiras.franco@udc.es	
Lecturers	Eiras Franco, Carlos	E-mail	carlos.eiras.franco@udc.es	
Web	campusvirtual.udc.gal/course/view.php?id=15392			
General description	A basic training course consisting of 6 credits that will introduce the student to the fundamental areas of this subject. Computer systems are systems capable of storing and processing information by means of different software and hardware elements. At the end of the course, the student will have been provided with the basic knowledge of Computer Systems, necessary to understand and approach with guarantees more advanced subjects of later courses.			

Study programme competences / results	
Code	Study programme competences / results
A7	CE7 - Interpretar los datos obtenidos mediante medidas experimentales y simulaciones, incluyendo el uso de herramientas informáticas, identificar su significado y relacionarlos con las teorías químicas, físicas o biológicas apropiadas.
A10	CE10 - Comprender la legislación en el ámbito del conocimiento y la aplicación de la Nanociencia y Nanotecnología. Aplicar principios éticos en este marco.
B2	CB2 - Que los estudiantes sepan aplicar sus conocimientos a su trabajo o vocación de una forma profesional y posean las competencias que suelen demostrarse por medio de la elaboración y defensa de argumentos y la resolución de problemas dentro de su área de estudio
B3	CB3 - Que los estudiantes tengan la capacidad de reunir e interpretar datos relevantes (normalmente dentro de su área de estudio) para emitir juicios que incluyan una reflexión sobre temas relevantes de índole social, científica o ética
B4	CB4 - Que los estudiantes puedan transmitir información, ideas, problemas y soluciones a un público tanto especializado como no especializado
B5	CB5 - Que los estudiantes hayan desarrollado aquellas habilidades de aprendizaje necesarias para emprender estudios posteriores con un alto grado de autonomía
B6	CG1 - Aprender a aprender
B7	CG2 - Resolver problemas de forma efectiva.
B10	CG5 - Trabajar de forma colaborativa.
B11	CG6 - Comportarse con ética y responsabilidad social como ciudadano/a y como profesional.
B12	CG7 - Comunicarse de manera efectiva en un entorno de trabajo.
C1	CT1 - Expresarse correctamente, tanto de forma oral coma escrita, en las lenguas oficiales de la comunidad autónoma
C2	CT2 - Dominar la expresión y la comprensión de forma oral y escrita de un idioma extranjero
C3	CT3 - Utilizar las herramientas básicas de las tecnologías de la información y las comunicaciones (TIC) necesarias para el ejercicio de su profesión y para el aprendizaje a lo largo de su vida
C5	CT5 - Entender la importancia de la cultura emprendedora y conocer los medios al alcance de las personas emprendedoras
C7	CT7 - Desarrollar la capacidad de trabajar en equipos interdisciplinares o transdisciplinares, para ofrecer propuestas que contribuyan a un desarrollo sostenible ambiental, económico, político y social.
C8	CT8 - Valorar la importancia que tiene la investigación, la innovación y el desarrollo tecnológico en el avance socioeconómico y cultural de la sociedad
C9	CT9 - Tener la capacidad de gestionar tiempos y recursos: desarrollar planes, priorizar actividades, identificar las críticas, establecer plazos y cumplirlos

Learning outcomes			
Learning outcomes	Study programme competences / results		
To understand the fundamental aspects of computer science		B4 B5 B6 B10 B11 B12	C1 C2 C3 C5 C8
To know the basic architecture and operation of a computer		B2 B5 B6	C3 C8
To know how information is represented internally in a computer	A10	B6	C1 C2 C5 C8
To learn the fundamentals of operating systems and databases.	A7 A10	B2 B3 B7 B10 B11 B12	C1 C2 C3 C7 C9
To learn and understand the fundamentals of different programming paradigms	A7	B2 B5 B6 B7 B10 B11 B12	C3

Contents	
Topic	Sub-topic
1. Operating systems	- File Systems - Command line - Users, profiles and access types
2. Introduction to programming	- What is a programming language - Data types and operators - Control statements - Functions and procedures - Use of libraries - Good programming habits
3. Relational databases	- Relational model - Entity-relational model - The SQL language
4. Networks	- Introduction and layer model - Link and network layer configuration

Planning

Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
ICT practicals	A7 B2 B6 B7 C3 C7 C8 C9	12	34	46
Seminar	A7 B2 B6 B7 C3 C8	8	8	16
Mixed objective/subjective test	A7 B2 B3 B4 B6 B7 B11 C3 C6 C9	2	0	2
Guest lecture / keynote speech	A7 A10 B2 B3 B4 B5 B6 B7 B10 B11 B12 C1 C2 C3 C5 C6 C8	28	56	84
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
ICT practicals	In the practical sessions the student will perform tasks such as operating system management, coding programs in Python language and database design and management. The instructions for each assignment will be provided sufficiently in advance so that students can make the best use of their time. It is the teacher's mission to supervise the code generated by the student to resolve doubts, correct bad programming styles, and correct errors.
Seminar	In the seminar sessions, exercises and practices will be carried out to detect the students' gaps of knowledge in the subject taught until that moment, and give the necessary explanations and/or references to amend them.
Mixed objective/subjective test	In the evaluation period, a test of theoretical knowledge and practical problem solving will be carried out to evaluate the student's acquisition of the competencies.
Guest lecture / keynote speech	In the theory sessions, the teacher describes the objectives and contents of the subject, in order to give a particular vision of the topic to be treated and relate it to others within the subject. Then the corresponding topic is developed through a master session, using the technical tools available, emphasizing specific issues in which the student must deepen their self-learning. The objective is for students to acquire the necessary computer skills to adequately develop their academic and professional lives. Python will be used as the coding language.

Personalized attention	
Methodologies	Description
Seminar ICT practicals	In the lecture sessions as well as in the practical laboratories and in the seminar sessions, personalized attention will be given to the student, at different levels according to the type of class, detecting the level of assimilation and understanding of the topics explained and the required practices to be implemented. The seminar sessions are where the student can be more easily reached to know the gaps in their knowledge and indicate how to cover them. Any doubts and questions will be resolved during class hours or in the hours established as tutorials for each professor.

Assessment			
Methodologies	Competencies / Results	Description	**Qualification**
Seminar	A7 B2 B6 B7 C3 C8	The seminar hours will have mechanisms to evaluate the student's progress. This evaluation will be reflected in 10% of the final grade.	10
ICT practicals	A7 B2 B6 B7 C3 C7 C8 C9	Throughout the course there will be three ICT practical works, amounting to a maximum value of 40% of the final grade.	40

Mixed objective/subjective test	A7 B2 B3 B4 B6 B7 B11 C3 C6 C9	The final exam will consist of theoretical questions and several exercises to put into practice the acquired competences. The final exam will have a maximum value of 50% of the final grade.	50

Assessment comments
To pass the subject, the student must obtain a minimum grade of 5 out of 10 in the result of combining the grades of the evaluable activities. In addition, the student must obtain a minimum grade of 4.5 out of 10 points in the combined test. If this minimum grade is not reached, the grade of the subject will be the one corresponding to the grade of the mixed test. Attendance to practical classes and seminars is mandatory to pass the course.A student will be considered to have concurred to an evaluation call if he/she submits a practical, if he/she attends an evaluable seminar or if he/she attends the mixed exam. The work submitted must be original work of the student. According to the academic regulations, the delivery of non-original work or with duplicated parts (either by copies among classmates or by obtaining it from other sources...) will lead to an overall grade of SUSPENSO (0; FAILED - F) in the corresponding exam session, both for the student who submits copied material and for the one who has provided it, invalidating any other grade obtained in the evaluable activities.About the shared responsibility of the group work. In the activities that are carried out in groups, such as ICT practicals, all members of the group will be jointly responsible for the work done and delivered, as well as the consequences arising from failure to comply with the rules of authorship of said work.Second opportunity and subsequent callsIn the second opportunity, the grade obtained in the practicals and seminars will be maintained. Students who take this second opportunity must take the mixed test. Optionally, and only in the case of not having submitted some of the practicals in the first opportunity or if they have obtained a grade of SUSPENSO, the practicals can be presented again in the second opportunity.In case of failing the course, the practical works with a grade equal to or higher than 5 may be kept for subsequent courses with a passing grade (5) if the student so wishes. For each assignment, the student will have the option of submitting a new practical work that will replace the grade of the previous one. Practicals will not be kept for more than one year. The grade for the seminars will not be saved for subsequent courses, and the student will have to complete the activities corresponding to this section again.Enrollment with academic waiverFor students enrolled with an academic waiver, attendance to internship and seminar classes is not mandatory. They must submit the internships on the established dates. It is the responsibility of these students to inform the professor of this circumstance.

Sources of information	
Basic	- Luis Joyanes Aguilar (2011). Fundamentos de programación: algoritmos, estructuras de datos y objetos. Madrid - Raúl González Duque (). Python para todos. http://edge.launchpad.net/improve-python-spanish-doc/0.4/0.4.0/+download/Python%20para%20todos.pdf - A. Silberschatz; H. Korth; S. Sudarshan (2019). Database System Concepts (7a edición). McGraw Hill - Alan Beaulieu (2009). Learning SQL (2ª Edición). O'Reilly - James F. Kurose, Keith W. Ross (2008). Redes de computadores: un enfoque descendente basado en Internet. Addison Wesley
Complementary	- Jesús J. García Molina, Francisco J. Montoya Dato, José L. Fernández Alemán, Ma José Majado Rosales (2005). Una introducción a la programación: un enfoque algorítmico. Thomson - Mark Lutz (2013). Learning Python, Fifth Edition. O'Reilly Media, Inc

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

Office hourseOffice hours are considered an important part of the development of the course. They are oriented in such a way that the students have and/or can consult different questions such as:1. Problems in the development of the assignments.2. Ways of approaching/organizing the assignments.3. Resolution of doubts about theoretical issues.Students will be asked to request appointments with the responsible professors for video calls via Teams or face-to-face meetings within the tutoring schedules of the faculty established in espazos.udc.es.Other recommendations:Read: Read the topic to be covered before attending the theoretical sessions, this is very important!Attend: Pay attention in class, do not simply sit in the classroom.Understand: Understand what you are told in the theory sessions and, if not, ask questions.Ask: Ask questions if you do not understand, do not remain with doubts.Study: Study after the sessions, to retain what is understood.Practice: Do many exercises, both those suggested and others on your own, both on paper and on the computer.Green Campus Science Faculty ProgramIn order to help achieve an immediate sustainable environment and comply with point 6 of the "Declaración Ambiental da Facultade de Ciencias (2020)", the documentary work carried out in this subject will be limited to virtual format and computer support.