Teaching Guide					
Identifying Data					2021/22
Subject (*)	Introduction to computer science and programming			Code	730G05008
Study programme	Grao en Enxeñaría Naval e Oceánica				
Descriptors					
Cycle	Period	Year		Type	Credits
Graduate	2nd four-month period	First		Basic training	6
Language	SpanishGalicianEnglish				
Teaching method	Face-to-face				
Prerequisites					
Department	Enxeñaría Industrial				
Coordinador	Prieto Guerreiro, Francisco		E-mail	francisco.prieto@udc.es	
Lecturers	Prieto Guerreiro, Francisco		E-mail	francisco.prieto@udc.es	
Web					
General description	1.- Introduction to the students in the fundamental concepts of computer science and the world of computers. 2.- Study of the main features of current computers and their internal function design. 3.- Study of information technology and communications networks as well as its main applications to the world of engineering. 4.- Study and effective utilization of the basic tools of all computer. 5.- Study and use of a programming language (c language) that allows to solve problems through engineering solutions.				

Contingency plan	1. Modifications to the contents The contents are not modified. 2. Methodologies All teaching methodologies are maintained, modifying only their face-to-face character. 3. Mechanisms for personalized attention to students Moodle: Daily. Email: Daily. Teams: 1 weekly session for expository teaching and 2 sessions for follow-up and resolution of doubts about practices and work to be done in the subject. Attention in personalized or group tutorials at established official time. 4. Modifications in the evaluation Mixed Test: 40% Individual exam on theoretical and practical contents of the subject. Continuous evaluation: 60% Tutored works and laboratory practices. * Evaluation observations: The evaluation methodologies are maintained except for their face-to-face character. 5.- Modifications to the bibliography or webgraphy Bibliographic material and web links from the initial guide are maintained.

Study programme competences / results	
Code	Study programme competences / results
A3	Basic knowledge on the use and programming of the computers, operating systems, databases and computer programs with application in engineering
B1	That the students proved to have and to understand knowledge in an area of study what part of the base of the secondary education, and itself tends to find to a level that, although it leans in advanced text books, it includes also some aspects that knowledge implicates proceeding from the vanguard of its field of study
B2	That the students know how to apply its knowledge to its work or vocation in a professional way and possess the competences that tend to prove itself by the elaboration and defense of arguments and the resolution of problems in its area of study
B4	That the students can transmit information, ideas, problems and solutions to a public as much specialized as not specialized
B5	That the students developed those skills of learning necessary to start subsequent studies with a high degree of autonomy
B6	Be able to carrying out a critical analysis, evaluation and synthesis of new and complex ideas.
C1	Using the basic tools of the technologies of the information and the communications (TIC) necessary for the exercise of its profession and for the learning throughout its life.
C4	Recognizing critically the knowledge, the technology and the available information to solve the problems that they must face.

C5	Assuming the importance of the learning as professional and as citizen throughout the life.

Learning outcomes			
Learning outcomes	Study programme competences / results		
Coñecer o funcionamento básico dos ordenadores, sistemas operativos e programas a nivel do usuario que permitan operar con equipamento informático de forma efectiva para recuperar, manipular e producir información.	A3	B1 B2 B4 B5 B6	C1 C4 C5
Analizar, prantexar e identificar solucions mediante a codificación de programas no ordenador empregando unha linguaxe de programación de alto nivel, que permitan resolver problemas de enxeñaría de forma efectiva.	A3	B1 B2 B5 B6	C1 C4 C5

Contents	
Topic	Sub-topic
Os temas seguintes desenvolven os contidos descritos na memoria de verificación do título, que son:	Estructura dos Computadores. (Tema 1, Tema 2) Sistemas Operativos. (Tema 4) Introdución ás redes de comunicacions. (Tema 6) Representación e almacenamento de datos e as suas aplicacions no ámbito da enxeñaría. (Tema 3) Algoritmia e Programación: Linguaxe C. (Tema 5 y Tema 7)
Theme 1.- Fundamental concepts of computer science.	1.1.- Historical background. 1.2.- Basic architecture of computers. 1.2.1.- Von Neumann architecture. 1.2.2.- CPU 1.2.3.- Memory. 1.2.4.- Input/output devices.
Theme 2.- New architectures	2.1.- Parallelism and Supercomputing. 2.1.- Parallelism in uniprocessor systems. 2.1.2.- Evolution of modern supercomputers 2.2.- Flynn's classification. 2.2.1.- Matrix computers. 2.2.2.- Vector computers. 2.2.3.- Multi-processor/multi-core systems.
Theme 3.- Encoding of information	3.1-Encoding of information in a computer. 3.2.- Binary representation. 3.2.1.- Internal representation of the data. 3.2.2.- Whole and floating point arithmetic. 3.2.3.- Encoding of non-numerical information. 3.2.4.- Other systems of representation: Octal and Hexadecimal.

Theme 4.- Operating systems.	4.1- General concepts of design and operation of an operating system. 4.2.- Microsoft operating systems: Windows vs Linux. 4.3.- Construction of the virtual machine in an operating system (coats of an operating system) 4.3.1.- Operating system kernel. 4.3.2.- Memory management. 4.3.3.- Management of input/output operations. 4.3.4.- File system management. 4.3.5.- Allocation of resources.
Theme 5.-Programming languages.	5.1.- Aspects of design and implementation in a programming language. 5.2.- Classification of programming languages. 5.3.- Low level languages. 5.4.- High level languages. 5.5.- Translators: Phases of operation. 5.5.1.- Assembly language 5.5.2.- Translators: Phases of operation 5.5.2.1.- Interpreters. 5.5.2.2.- Compilers.
Theme 6.- Computer networks.	6.1.- Historical background. 6.2.- Classification of computer networks. 6.3.- Functions and network services. 6.4.- Network architectures. 6.4.1.- Types of network. 6.4.2.- Network protocols. 6.5.- Internet network. 6.5.1.- IP addresses. 6.5.2.- TCP/IP network protocol. 6.5.3.- Internet architecture. 6.5.4.- NET internet services. 6.5.5.- Systems and technology of network connection: ADSL, Cable, Wifi/WiMax, PLC, FTTH. 6.5.6.- How to measure the performance of a network. 6.5.7.- Security and encryption.
Theme 7.- C programming language.	7.1.- Introduction to the c language. 7.2.- Types, identifiers and operators. 7.3.- Input/output console. 7.4.- Control statements. 7.5.- Arrays and strings. 7.6.- Functions: Pass parameters by value and reference (pointers). 7.7.-Structures, unions, enumerations and user-defined types. 7.8.- Sorting and searching algorithms. 7.9.- Files. 7.10.- Dynamic Data Structures

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Guest lecture / keynote speech	A3 B1 C1 C4 C6	30	30	60
Mixed objective/subjective test	A3 B1 B2 B5 B6 C1	3	0	3

Laboratory practice	A3 B1 B2 B4 B5 B6 C1 C4 C5	26	28	54
Supervised projects	A3 B1 B2 B4 B5 B6 C1 C4 C5	0	20	20
Personalized attention		13	0	13
(*)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	The contents of the course will be developed both theoretically and practical in Keynote sessions.
Mixed objective/subjective test	The objective test will be divided into two parts, a theoretical part and a practical one. This test will try to check if the student has acquired the skills set as target in this subject.
Laboratory practice	Study and use of a programming language (C language) that allows to resolve various engineering problems through computer solutions.
Supervised projects	In the keynote sessions and laboratory practices will be raised practical problems of greater complexity to be solved as independent student work, both individually and in students groups. In that resolution the participation of students is encouraged as a self-learning tool valuing their effort and their results aimed to the final evaluation of the subject.

Personalized attention	
Methodologies	**Description**
Supervised projects Guest lecture / keynote speech Laboratory practice	The student will have tutorials to clarify their doubts about the themes exposed in classes, about resolution of laboratory exercises and coursework or on any matter-related scope and approach.

Assessment			
Methodologies	**Competencies / Results**	**Description**	**Qualification**
Supervised projects	A3 B1 B2 B4 B5 B6 C1 C4 C5	In the keynote sessions and laboratory practices will be raised practical problems of greater complexity to be solved as independent student work, both individually and in students groups. In that resolution the participation of students is encouraged as a self-learning tool valuing their effort and their results with a view to the final evaluation of the subject. Its realization and presentation correct and on time to the teacher will be required to pass the course. These practices will have a maximum value of 40 % of the final grade.	40
Mixed objective/subjective test	A3 B1 B2 B5 B6 C1	The objective test will be divided into two parts, a theoretical part and a practical one. This test will try to check if the student has acquired the skills set as target in this subject. It will be necessary to obtain a minimal note of 1 point in each part (max 2 points each part) and to be submitted all practices correctly and on time in order to pass the course.	40
Laboratory practice	A3 B1 B2 B4 B5 B6 C1 C4 C5	Study and use of a programming language (C language) that allows to resolve various engineering problems through computer solutions. Its realization and presentation correct and on time to the teacher will be required to pass the course. These practices will have a maximum value of 20 % of the final grade.	20

Assessment comments

Students with academic exemption, as they are not required to attend activities in which attendance may be required, also present and defend the obligatory works and practices before the teacher in face-to-face or virtual tutorials, in the same periods as the rest of the students .

The qualification of all students, both in the first and in the second opportunity, as well as in the extra opportunity, will be based on the need to obtain at least a minimum mark of 1 point in the theoretical part and another point in the practical part of the exam (maximum of 2 points in each part, with a total of 4 points) and having correctly presented and defended no time before the teacher all the obligatory practices and / or assignments in order to pass the course.

The fraudulent performance of the tests or evaluation activities will directly imply the failure grade '0' in the subject for the corresponding opportunity, thus invalidating any grade obtained in all the evaluation activities for the extraordinary opportunity.

Students who have not submitted, defended and approved all the practices and/or compulsory assignments for the first opportunity, must do so for the second opportunity and complete an additional exercises bulletin for said opportunity.

Sources of information	
Basic	- Herbert Shildt (). C. Manual de Referencia . Ed. McGraw-Hill - F. Prieto (). Libro de apuntes elaborado por el profesor de la asignatura. - J. Angulo (). Estructura de Computadores. Ed. Paraninfo - Prieto, Lloris, Torres. (). Introducción a la informática. Ed. McGraw-hill - Steven Chapra (). Introducción a la computación para ingenieros . Ed. McGraw-Hill - Behrouz A. Forouzan (). Transmisión de datos y redes de comunicaciones. Ed. McGraq-Hill - Jose R. Garcia-Bermejo (). Programación esctructurada en C. Ed. Prentice Hall - Gerardo G. /César Vidal (). Lenguaje C. Aplicaciones a la Programación. Reprografía del Noroeste - James L. Antonakos / Kenneth C. (). Programación Estructurada en C. Prentice Hall
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
Given that the subject is taught in the second semester of the first year of Naval and Oceanic Engineering, prior knowledge necessary to pursue this course consist of the knowledge of the subjects of Informatics taught in Scientific and technological secondary education options. If the student comes from another secondary education option is especially recommended its study to acquire a minimum knowledge bases.