UNIVERSIDADE DA CORUÑA

Teaching Guide				
Identifying Data				2015/16
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	FB	6
Language	SpanishGalicianEnglish			
Teaching method	Face-to-face			
Prerequisites				
Department	Enxeñaría Industrial			
Coordinador	Prieto Guerreiro, Francisco	E-mail	francisco.prieto@udc.es	
Lecturers	Cardona Comellas, Jose Maria Prieto Guerreiro, Francisco	E-mail	jose.cardona@udc.es 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.			

Study programme competences	
Code	Study programme competences
A1	Skill for the resolution of the mathematical problems that can be formulated in the engineering. Aptitude for applying the knowledge on: linear algebra; geometry; differential geometry; differential and integral calculation; differential equations and in partial derivatives; numerical methods; algorithmic numerical; statistics and optimization
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.
C2	Coming across for the exercise of a, cultivated open citizenship, awkward, democratic and supportive criticism, capable of analyzing the reality, diagnosing problems, formulating and implanting solutions based on the knowledge and orientated to the common good.
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.
C6	Recognizing the importance that has the research, the innovation and the technological development in the socioeconomic and cultural advance of the society.

Learning outcomes			
Learning outcomes	Study programme competences		
1.- Study of information technology and communications networks as well as their applications to the world of engineering. Effective utilization of the basic tools of all computer.	A3	B1	C1 C4 C6
2.-Study of information technology and communications networks as well as its main applications to the world of engineering. Study and effective utilization of the basic tools of all computer.	A1 A3	B1 B2 B4 B5 B6	C1 C2 C4 C5 C6
3.- Study and use of a programming language (c language) that allows to solve problems through engineering solutions.	A1 A3	B1 B2 B5 B6	C1 C4 C5 C6

Contents	
Topic	Sub-topic
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	Ordinary class hours	Student?s personal work hours	Total hours
Guest lecture / keynote speech	A3 B1 C1 C4 C6	30	30	60
Objective test	A1 A3 B1 B2 B5 B6 C1	3	0	3
Laboratory practice	A1 A3 B1 B2 B4 B5 B6 C1 C2 C4 C5 C6	26	28	54
Supervised projects	A1 A3 B1 B2 B4 B5 B6 C1 C2 C4 C5 C6	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.
Objective 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**	**Description**	**Qualification**
Supervised projects	A1 A3 B1 B2 B4 B5 B6 C1 C2 C4 C5 C6	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 to the teacher will be required to pass the course. These practices will have a maximum value of 20 % of the final grade.	20
Objective test	A1 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 1,5 points in each part (max 3 points each part) and have submitted all practices and / or work in order to pass the course.	60
Laboratory practice	A1 A3 B1 B2 B4 B5 B6 C1 C2 C4 C5 C6	Study and use of a programming language (C language) that allows to resolve various engineering problems through computer solutions. Its realization and presentation 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

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.