UNIVERSIDADE DA CORUÑA

Teaching Guide					
Identifying Data					2019/20
Subject (*)	Mathematics 1			Code	730G05001
Study programme	Grao en Enxeñaría Naval e Oceánica				
Descriptors					
Cycle	Period	Year		Type	Credits
Graduate	1st four-month period	First		Basic training	6
Language	SpanishGalician				
Teaching method	Face-to-face				
Prerequisites					
Department	Matemáticas				
Coordinador	Brozos Vázquez, Miguel		E-mail	miguel.brozos.vazquez@udc.es	
Lecturers	Brozos Vázquez, Miguel		E-mail	miguel.brozos.vazquez@udc.es	
Web	campusvirtual.udc.es/moodle				
General description	This introductory calculus course covers differentiation and integration of functions of one and several variables. Topics include: the study of functions of one and several variables, their continuity and differenciability; Taylor polynomials and its application in optimization, finding local extrema and constrained optimization; the integration of functions in one variable, both by using Riemann sums and numerical integration and also using Barrow's rule, together with its applications to computing arc lengths, volumes of revolution and surface areas of revolution; and finally the integration of functions of several variables, together with its application to computing volume and mass of a solid body and its center of mass.				

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
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
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.
C4	Recognizing critically the knowledge, the technology and the available information to solve the problems that they must face.

Learning outcomes			
Learning outcomes	Study programme competences		
Identify mathematical concepts and tools to solve problems that can appear in an engineering context.	A1	B1 B2 B5 B6	C4
To show the ability of using techniques of Linear Algebra, Geometry and Calculus to be applied in problem solving.	A1	B1 B2 B5 B6	C4

Contents	
Topic	Sub-topic

The R^n space	- The complex plane. Operations with complex numbers. Polar form. - Vector structure: The linear spaces R^2 and R^3. Linear subspaces. Bases and dimension. Coordinates. Systems of linear equations. - Metric structure: Scalar product, norm and distance. - Topological structure: Topological classification of points and sets. Polar, cylindrical and spherical coordinates.
Linear maps	Maps. Linear maps. Basic properties of linear maps. Matrix associated to a linear map. Diagonalization of endomorphisms: invariant subspaces, eigenvalues and eigenvectors, diagonalizable endomorphisms.
Differential Calculus	Topology in R. Functions of one variable. Continuity. Smooth functions of one variable. Taylor polynomial. Parametrized curves in R^n. Reparametrizations.
Integral Calculus	Riemann sums. Integrable functions. Main theorems in integral calculus: Mean value theorem, Fundamental theorem and Barrow's rule. Computation of primitive functions. Polynomial interpolation. Numerical integration: Simpsons' rule. Computation of volumes. Length of curves and line integrals of scalar functions.

Planning				
Methodologies / tests	Competencies	Ordinary class hours	Student?s personal work hours	Total hours
Guest lecture / keynote speech	A1 B6 B5 C4	30	30	60
Problem solving	A1 B1 B2 B5 B6 C4	30	30	60
Supervised projects	A1 B1 B2 B5 B6 C4	0	10	10
Mixed objective/subjective test	A1 B1 B2 B5 B6 C4	8	8	16
Personalized attention		4	0	4
(*)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 course will be developed during the regular classes where the professor will explain the main concepts and results of the subject.
Problem solving	This classes are organiized in such a way that we practice how to solve the proposed problems.
Supervised projects	Homework that professors is going to asses during the course.
Mixed objective/subjective test	Three exams will be carried out during the course. The first one will be a partial exam where only some of the chapters will be considered. A final exam will be done at the end of the semester. Furthermore a computer exam will be carried out.

Personalized attention	
Methodologies	**Description**
Problem solving Supervised projects	The contents of the subject as well as the developed methodologies require that students also work by themselves. This can generate some personalized questions that they can solve by asking the teachers. The students with recognition of part-time dedication and academic exemption from attendance can use the tutorials as a reference in order to follow the course and the autonomous work.

Assessment			
Methodologies	**Competencies**	**Description**	**Qualification**
Mixed objective/subjective test	A1 B1 B2 B5 B6 C4	Written exams to assess the knowledge of the subject by the students. The subject will consist on two parts and the final qualification of the subject will be the addition of the qualification obtained at each of these parts. 1) The first one will be performed during the teaching period and will involve all the chapters studied until the celebration of the exam. If the student passes this exam, the qualification is retained until the end of the present course. This part will be recoverable in the final exam (second chance), to be held in July. 2) The second (and final) exam will be carried out in the period of final exams. It will involve the second part of the subject and a second chance to pass the first part. In case of passing any of these two parts, either in the partial exam or in the final exam of January, the qualification is retained for the present course until the exam of second opportunity.	80
Supervised projects	A1 B1 B2 B5 B6 C4	Homework that professors is going to asses during the course.	20

Assessment comments
The students with recognition of part-time dedication and academic exemption from attendance will be assessed through the objective tests in the same conditions as the rest of the students. The second opportunity will be developed in the same conditions as the first one.

Sources of information

Basic	- Salas, L., Hille, E., Etgen, G. (2003). Calculus. vol I-II. Madrid. Reverté - García Castro, F., Gutiérrez Gómez, A. (1990-1992). Cálculo Infinitesimal. I-1,2. Pirámide. Madrid - Marsden, J., Tromba, A. (2010). Cálculo vectorial. ADDISON WESLEY - Tébar Flores, E. (1977). Cálculo Infinitesimal. I-II. Madrid. Tébar Flores - García, A. et al. (2007). Cálculo I. Teoría y Problemas de Análisis Matemático en Una Variable. Madrid. Clagsa - Larson, R., Hostetler, R., Edwards, B. (2013). Calculus. . Brooks Cole - Coquillat, F (1997). Cálculo Integral. Madrid. Tebar Flores - Soler, M., Bronte, R., Marchante, L. (1992). Cálculo infinitesimal e integral. Madrid - Burgos Román, Juan de (2007). Cálculo infinitesimal de una variable. Madrid. McGraw-Hill - Villa Cuenca, A. (1994). Problemas de Álgebra.. CLAGSA - Grossman, S. I. (1995). Álgebra Lineal con Aplicaciones.. Mcgraw-Hill - Granero Rodríguez, F. (1991). Álgebra y Geometría Analítica. Mcgraw-Hill - Ladra, M., Suárez, V., Torres, A. (2003). Preguntas test de Álgebra Lineal y Cálculo Vectorial. E. U. Politéctica - Burgos, J. (1993). Álgebra lineal. McGrawHill - Larson, R., Edwards, B.H., Calvo, D. C. (2004). Álgebra lineal.. Pirámide Ediciones - Lay, D. C. (2007). Álgebra lineal y sus aplicaciones. Addison-Wesley - Gómez Bernúdez, C. (2015). Problemas de Álxebra Linear.. Andavira - Gómez Bernúdez, C, Gómez Gratacos, F. (2018). Problemas de Cálculo. Anvavira
Complementary	Recoméndanse recursos bibliográficos da páxina http://maxima.sourceforge.net/para o uso do programa Maxima, que servirá de apoio nesta materia. www.intmath.com www.ies.co.jp/math/java/ http://193.146.36.49/mat1

Recommendations
Subjects that it is recommended to have taken before
Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
Mathematics 2/730G05005 Differential equations/730G05011
Other comments
Homework of this course will attend to the following: ? Preferably, virtual homework will be used, when printing is not required.   ? In the case that paper is needed, then: -   No plastic materials will be used.   -   Printing will be done both sides.   -   Recycled paper will be used as possible.   -   Unnecessary printed drafts will be avoided.   In general, a sustainable use of natural resources will be done. Moreover, ethic principles related to sustainability will be followed.

(*)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.