UNIVERSIDADE DA CORUÑA

Teaching Guide				
Identifying Data				2016/17
Subject (*)	Calculus		Code	614G01003
Study programme	Grao en Enxeñaría Informática			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	1st four-month period	First	FB	6
Language	SpanishGalicianEnglish			
Teaching method	Face-to-face			
Prerequisites				
Department	Matemáticas			
Coordinador	Gonzalez Taboada, Maria	E-mail	maria.gonzalez.taboada@udc.es	
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Web	http://dm.udc.es/elearning/			
General description	In this subject we explain concepts of the analysis of real functions of a real variable (continuity, derivative, integration, ...) and series (numerical, of powers, ...), with applications in real problems of optimisation and approximation of functions.			

Study programme competences	
Code	Study programme competences
A1	Capacidade para a resolución dos problemas matemáticos que se poden presentar na enxeñaría. Aptitude para aplicar os coñecementos sobre: álxebra linear; cálculo diferencial e integral; métodos numéricos; algorítmica numérica; estatística e optimización.
B3	Capacidade de análise e síntese

Learning outcomes			
Learning outcomes	Study programme competences		
Being able to analyze functions of a real variable: - Limits , continuity, differentiation, optimization and graphical representation - Definite and indefinite integration and its application to the calculation of areas and volumes , as well as solving differential equations - Approximation by power series	A1	B3	
Being able to use a computer application symbolic computation and computational development of the contents of the subject	A1	B3	

Contents	
Topic	Sub-topic
Real valued functions of one real variable	- Real valued functions of one real variable - Elemental functions - Limit of a function at one point - Continuity - Bisection method - Lagrange interpolation

Differential calculus of real valued functions of one real variable	- Differentiability - Derivative of elementary functions - Newton-Raphson Method - Relative and absolute extrema - Theorems of differential calculus - Immediate applications of derivatives - Higher order derivatives - Taylor's theorem - Implicit and logarithmic differentiation
Integral calculus of real valued functions of one variable	- The Riemann integral - Elemental methods for the calculus of primitives - Improper integrals - Applications of the integral - Numerical integration - Introduction to differential equations
Series of real numbers and power series	- Sequences of real numbers - Series of real numbers. Series of positive numbers - Alternating Series - Power Series
Calculus with Octave	- Basic concepts - Differential and integral calculus

Planning				
Methodologies / tests	Competencies	Ordinary class hours	Student?s personal work hours	Total hours
Guest lecture / keynote speech	A1 B3	30	60	90
Laboratory practice	A1 B3	18	18	36
Seminar	A1 B3	9	9	18
Mixed objective/subjective test	A1 B3	0	3	3
Personalized attention		3	0	3
(*)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	- Presentations in .pdf format (previously provided to students) containing the basic notes to follow the development of the subject, will be maid using a projector - Theory will be presented using the blackboard and providing clarifying examples - applets created explicitly for the subject and others available on the Internet will be used to illustrate some aspects of the subject.
Laboratory practice	- The use of the software package Octave, which will be used in the subject for symbolic and numerical computation, will be taught . - Problems related to the subject will be solved using Octave
Seminar	- In small groups tutories (TGR), which are called " Seminars " in this guide, doubts of students will be solved, as well as exercises of the problems sets --available on beforehand-- or other problems proposed by the teacher . The acquisition of knowledge and student participation is valued .
Mixed objective/subjective test	- A written exam, consisting of a collection of theoretical and/or problems issues (of the same type as those proposed in the seminars (TGR) and problems sets exercises) will be done

Personalized attention

Methodologies	Description
Laboratory practice Seminar	- The diversity of the students and their formation recomends giving an orientation, that should be carried out in the framework of a personalized tutorial action. - In the laboratory sessions the teacher, who will be present in the clasroom, will guide and helo students to develop the practises, teaching them in the use of a software package, helping them to understand some theoretical and practical aspects of the subject. - During the seminars (TGR) the teacher will help the students in the resolution of theoretical and applied exsercises. Without forgetting that, as already mentioned, that doubts can also be solved in a more personal way in the tutorial hours of the teacher.

Assessment			
Methodologies	Competencies	Description	**Qualification**
Laboratory practice	A1 B3	Resolución de problemas da materia coa axuda de Octave	30
Seminar	A1 B3	Resolución de traballos e/ou exercicios teórico-prácticos da materia e as súas aplicacións.	10
Mixed objective/subjective test	A1 B3	Examen teórico-práctico da materia	60

Assessment comments
The evaluation of the course consists of two parts : 1. The first part consists in carrying out an examination of theory and exercises of the subject (on the dates approved by the Faculty Board) that will score up to six points. 2. The second part corresponds to the seminars and computer practices , which will be assigned one and three points, respectively. This score is obtained by performing exercises, works, memoranda and/or exams throughout the semester or at the end of it In July the second time the evaluation process will include a mixed test that will score a maximum of seven points. This grade will be added the qualification obtained in laboratory practices . The evaluation of TGR and laboratory practices of part-time students can be made taking into account, as far as posibe their particular circumstances. Regarding the extraordinary December assessment process, it will include : a) a mixed test that will score a maximum of seven points, b) one examination to assess the knowledge acquired in the laboratory practices, which punctuate a maximum of three points.

Sources of information	
Basic	- R.T. Smith, R.B. Minton (2002). Calculus (Second edition). McGraw-Hill - J. Stewart (2001). Cálculo de una variable. Thomson Learning - M.T. Iglesias Otero (2011). MatLab para Cálculo en una variable. Andavira

Complementary	- G.L. Bradley, K.J. Smith (1998). Cálculo 1. Prentice Hall - F. Coquillat (1997). Cálculo Integral. Metodología y problemas. Tébar Flores - A. Estévez Andreu, J. Enciso Pizarro (2005). Matemáticas (serie "Aprueba tu examen con Schaum"). McGraw-Hill - F. Galindo Soto, J. Sanz Gil, L.A. Tristán Vega (2003). Guía práctica de Cálculo Infinitesimal en una variable real. Thomson - A. García, A. López, G. Rodríguez, S. Romero, A. De La Villa (2002). Cálculo (vol. 1). CLAGSA - B.D. Hahn, D.T. Valentine (2007). Essential Matlab for Engineers and Scientistics (3th ed.) . B.H. - S. Josa (1992). Cómo iniciarse en la resolución de integrales. Edunsa - S. Lantarón Sánchez, B. Llanas Juárez (2010). Matlab y Matemática Computacional . Bellisco Ediciones - R. Larson, R. Hostetler, B.H. Edwards (2010). Cálculo Esencial. Cengage Learning - C. Neuhauser (2004). Matemáticas para Ciencias. Pearson - V. Tomeo Perucha, I. Uña Juárez, J. San Martín Moreno (2005). Problemas resueltos de Cálculo en una variable. Thomson

Recommendations
Subjects that it is recommended to have taken before
Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
Numerical Methods for Computing/614G01064
Other comments
Daily work is recommended for getting optimal profit from the seminars (TGR) and laboratory practices. Also assistance to the master classes is recommended