Teaching Guide				
Identifying Data				2019/20
Subject (*)	Mathematics I		Code	670G01001
Study programme	Grao en Arquitectura Técnica			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	1st four-month period	First	Basic training	6
Language	Galician			
Teaching method	Face-to-face			
Prerequisites				
Department	Matemáticas			
Coordinador	Garcia Abel, Marta	E-mail	marta.gabel@udc.es	
Lecturers	Benitez Garcia, Marta Garcia Abel, Marta	E-mail	marta.benitez@udc.es marta.gabel@udc.es	
Web				
General description	Esta materia impártese no primeiro cuadrimestre do primeiro curso da titulación e forma parte dos 60 créditos básicos do título de Grao. É por iso unha materia de tipo xeral, na que se trata de proporcionar ao alumnado uns coñecementos básicos de matemáticas e da súa aplicación en carreiras técnicas. É validable en calquera outra carreira da rama científico-técnica.			

Study programme competences	
Code	Study programme competences
A1	Adquirir os coñecementos fundamentais sobre matemáticas, estatística, física, química e acústica como soporte para o desenvolvemento das habilidades e destrezas propias da titulación.
A2	Adquirir os coñecementos fundamentais sobre os sistemas e aplicacións informáticas específicos e xerais utilizados no ámbito da edificación.
A8	Deseñar, calcular e executar estruturas de edificación.
A9	Deseñar, calcular e executar instalacións de edificación.
A19	Aplicar as técnicas, interpretar resultados e tomar decisións para o control da calidade da obra.
B1	Capacidade de análise e síntese.
B2	Capacidade de organización e planificación.
B3	Capacidade para a procura, análise, selección, utilización e xestión da información.
B4	Coñecementos de informática relativos ao ámbito de estudo.
B5	Capacidade para a resolución de problemas.
B6	Capacidade para a toma de decisións.
B7	Capacidade de traballo en equipo.
B12	Razoamento crítico.
B14	Aprendizaxe autónomo.
B16	Capacidade de aplicar os coñecementos na práctica.
B25	Hábito de estudo e método de traballo.
B26	Capacidade de razoamento, discusión e exposición de ideas propias.
B27	Capacidade de comunicación a través da palabra e da imaxe.
B28	Capacidade de improvisación e adaptación para enfrontarse a novas situacións.
C1	Adequate oral and written expression in the official languages.
C3	Using ICT in working contexts and lifelong learning.
C4	Acting as a respectful citizen according to democratic cultures and human rights and with a gender perspective.
C5	Understanding the importance of entrepreneurial culture and the useful means for enterprising people.
C6	Acquiring skills for healthy lifestyles, and healthy habits and routines.

C7	Developing the ability to work in interdisciplinary or transdisciplinary teams in order to offer proposals that can contribute to a sustainable environmental, economic, political and social development.
C8	Valuing the importance of research, innovation and technological development for the socioeconomic and cultural progress of society.

Learning outcomes			
Learning outcomes	Study programme competences		
To consolidate student?s knowledge of calculus and cover gaps in relation to some basic contents, by encouraging the relationship between theory and practice.	A1	B1 B3 B5 B7 B16	C3 C6 C7 C8
To know and to connect the basic concepts and fundamental tools of calculus, and to be fluent in mathematical language appearing in the subject.	A1	B1 B5 B7 B12 B14	C3 C6 C7 C8
To get ability of thinking in an abstract way from the concrete, and to apply abstract results to concrete situations.	A1 A8 A9	B1 B3 B5 B27	C1 C3 C6 C7 C8
To know some mathematical models required for the formulation and solving of problems in construction sector.	A1 A8 A9 A19	B1 B3 B5 B6 B7	C3 C4 C6 C7 C8
To become aware that knowledge, skills and abilities achieved through the study of this subject are fundamental for academic career and future	A1 A8 A9	B1 B2 B3 B4 B5 B6 B7 B25 B26	C3 C4 C5 C6 C7 C8
To consolidate knowledge of statistics and probability.	A1 A8 A9	B1 B3 B4 B5 B6 B7	C1 C3 C4 C7 C8
To acquire fundamental knowledge of specific and general computer applications used in construction sector.	A2	B28	

Contents	
Topic	Sub-topic

SUBJECT 1.- FUNCTIONS OF ONE VARIABLE	1.1.- Definition and basic concepts. 1.2.- Limit of a function at a point. Properties. Operations. Infinite limits and limits at infinity. 1.3.- Continuity. Discontinuities. Properties of continuous functions. 1.4.- Derivative. Properties. Geometrical meaning. Chain rule. Taylor polynomial. 1.5.- Interpolation.
SUBJECT 5.- STATISTICS AND PROBABILITY	5-1 STATISTICS: 5-1.1 Statistics descriptive for one variable. 5-1.2 Previous concepts. Frequency tables. 5-1.3 Graphic representation. Characteristic measurement, position, dispersion 5-1.4 Statistics descriptive for several variables. 5-1.5 Bidimensional variable. Frecuency distribution. Graphic representation. Regression and correlation 5-2 PROBABILITY: 5-2.1 Probability. Random experiment. Sample space. Events. Probability definition. 5-2.2 Conditional probability. Independent events. Product and total probabilities rules. Bayes? theorem. 5-2.3 Probability distribution. Aleatory variable discrete and continuous. Expectation and variance. 5-2.4 Binomial distribution. Normal distribution 5-2.5 Introduction to statistical inference
SUBJECT 3.- INTEGRATION OF FUNCTIONS	3.1.- Concept of primitive. Properties. 3.2.- Methods of integration. Primitive calculus. 3.3.- Improper integrals. 34.- Geometrical applications. Areas, volumes, lengths. 3.5.- Numerical integration.
SUBJECT 4.- DIFFERENTIAL EQUATIONS. NUMERICAL METHODS.	4.1.- Definition and basic concepts. 4.2.- First order differential equations: separated variables, homogeneous, linear. 4.3.- Numerical methods: Euler, Runge-Kutta.
SUBJECT 2.- FUNCTIONS OF SEVERAL REAL VARIABLES	2.1.- Definitions and basic concepts. 2.2.- Limit. Properties. Operations. 2.3.- Continuity. 2.4.- Differentiation. Partial derivatives. Properties. 2.5.- Tangent plane and normal straight. 2.6.- Relative extremes with and without constrains. Lagrange multipliers method.
Attached: Computer programm MAXIMA	Problems may be solved assisted by the computer programm Maxima

Planning				
Methodologies / tests	Competencies	Ordinary class hours	Student?s personal work hours	Total hours
Directed discussion	A1 A8 A9 A19 B1 B2 B3 B4 B5 B6 B7 B12 B14 B25 B26 B27 B28 C1 C3 C4 C5 C6 C7 C8	30	45	75
Short answer questions	A2 B1 B26 C1	1	0	1
Problem solving	A1 A8 A9 A19 B1 B16	3	0	3
Objective test	A1 B1	3	0	3

Guest lecture / keynote speech	A1 A2 B12 B25 B26	30	33	63
Personalized attention		5	0	5
(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.				

Methodologies	
Methodologies	**Description**
Directed discussion	Solving exercises during regular classes in a participatory way. Some problems will be solved assisted by the computer programm Maxima.
Short answer questions	It will be a final exam consisting of questions with alternative or short answers.
Problem solving	In the final exam, several exercises related to what was explained during the course must be solved by students.
Objective test	For the continuous assessment option, several exams must be done by students throughout the course.
Guest lecture / keynote speech	In the regular classes, the professor will explain the main concepts and results of the subject.

Personalized attention	
Methodologies	**Description**
Directed discussion Guest lecture / keynote speech	Personalized attention consists of face-to-face hours of the students with the professor which involve student participation. More precisely, the most important ones are: personalized tutorial and assessment (written exams, practical tests by using the computer and presentation of academic assignments). Personalized attention for students with recognition of part-time dedication and academic exemption from attendance will be stablished at the beginning of the course by the lecturers by taking into account the specific characteristics of students.

Assessment			
Methodologies	**Competencies**	**Description**	**Qualification**
Short answer questions	A2 B1 B26 C1	It will be an exam with several short questions.	30
Problem solving	A1 A8 A9 A19 B1 B16	It will be a final exam including several problems (practical exercises).	50
Objective test	A1 B1	These consist of several exams for students with regular attendance choosing continuous assessment.	20

Assessment comments

Students will be assessed through
?continuous assessment? consisting of two parts or ?stages?.

FIRST
STAGE:

Several
exams will be done by students throughout the course.
Active attendance in the class will be taken
into account for assessment (1 point at most).
In this stage, students could pass the
subject by passing the established exams.

SECOND STAGE:
Students failing the subject in the ?first
stage?, will be able to pass the subject by doing a final exam consisting of
theoretical and practical questions.
The final mark will be the sum of 80% of the
final exam and 20% of the continuous assessment.
Students participating in some of the
scheduled assignments throughout the course will be assessed at
the end of the course. They will not be marked as not-presented.
SECOND OPORTUNITY: In this oportunity (July)
the same criteria as those of the second part will be considered.
Students with recognition of part-time
dedication and academic exemption from attendance will be graded under the same
conditions than other students, as explained above.

In special cases, such as,
SICUE or Erasmus students, specific exams could be established.

Sources of information	
Basic	- Alfonsa García y otros (2007). CÁLCULO I . CLAGSA - Alfonsa García y otros (2002). Cálculo II. CLAGSA - Larson - Hostetler (1999). CÁLCULO Y GEOMETRÍA ANALÍTICA. Mc Graw Hill - Frank Ayres, Jr (2010). Cálculo (5ª edición). Mc-Graw-Hill - Burgos, Juan de (2008). Fundamentos matemáticos de la Ingeniería (Álgebra y Cálculo). Madrid: García-Maroto - García Merayo, Félix (1997). MÉTODOS NUMERICOS EN FORMA DE EJERCICIOS. Universidad Pontificia de Comillas

Complementary	- Burden, Richard L. (2011). Análisis Numérico. México: Cengage Learning - Simmons, George F. (1996). ECUACIONES DIFERENCIALES CON APLICACIONES Y NOTAS HISTÓRICAS. Madrid: McGraw-Hill - Adams, Robert A. (2009). CÁLCULO. Madrid:Prentice Hall - Bartoll Arnau, S. y otros (2009). FUNDAMENTOS MATEMÁTICOS EN ARQUITECTURA. Valencia: Editorial de la UPV - Ramos del Olmo-Rey Cabeza J.M. (2017). Matemáticas básicas para el acceso a la universidad. Ed. Pirámide - Miller, Irwin (2004). Probabilidad y estadística para Ingenieros. Barcelona: Reverté

Recommendations
Subjects that it is recommended to have taken before
Subjects that are recommended to be taken simultaneously
Mathematics II/670G01006
Subjects that continue the syllabus
Other comments
To study this subject, it is important that students have mathematical knowledge corresponding to the science area. To understand and pass other subjects in the career, it is positive to master this subject.