



## IDENTIFYING DATA

### Mathematics: Mathematics 1

Subject	Mathematics: Mathematics 1			
Code	V11G201V01103			
Study programme	Grado en Química			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Basic education	1st	1st
Teaching language	#EnglishFriendly Galician			
Department				
Coordinator	Quinteiro Sandomingo, María del Carmen			
Lecturers	Quinteiro Sandomingo, María del Carmen			
E-mail	quinteir@uvigo.gal			
Web	<a href="http://moovi.uvigo.gal/">http://moovi.uvigo.gal/</a>			
General description	<p>"Machine translation into English of the original teaching guide".</p> <p>The course has theoretical contents, as well as practical, of linear algebra, multivariable calculus and integration.</p> <p>Undertaking this course will allow the students to improve his/her capacity to understand and use of mathematical language and let them to acquire certain proficiency in calculus and initiate oneself in the use of related computer applications.</p> <p>English Friendly course. International students may request from the teachers: a) material and bibliographic references in English, b) tutoring sessions in English, c) exams and assessments in English.</p>			

## Training and Learning Results

Code	
A1	Students can apply their knowledge and understanding in a manner that indicates a professional approach to their work or vocation, and have competences typically demonstrated through devising and sustaining arguments and solving problems within their field of study
B4	Ability for analysis and synthesis
C21	Know mathematical concepts based on previous ones and be able to use them in the different contexts of Chemistry
D1	Ability to solve problems

## Expected results from this subject

Expected results from this subject	Training and Learning Results			
To calculate eigenvalues of a square matrix and classify quadratic forms attending to the sign.			C21	D1
To operate with real and complex numbers.			C21	D1
To apply the differential calculus to the local approximation of functions and to the resolution of optimization problems.	A1	B4	C21	D1
Employ integral calculus to determine areas and volumes.			C21	D1
To handle computing programs of calculus and graphic representation.			C21	D1

## Contents

Topic	
Real numbers and complex numbers	The real numbers and the real line. Operations with real numbers. Complex numbers. Operations with complex numbers.
Eigenvalues and symmetric matrices	Computation of eigenvalues of a matrix. Diagonalizable matrices. Quadratic forms. Sign of a quadratic form.

Calculus of several variables	Introduction to the real functions of several variables. Differentiable functions. Higher order derivatives. The chain rule. Implicit differentiation. Computation of extreme points
Integration in one and several variables	Riemann integral. Fundamental Theorem of the Integral Calculus. Calculation of primitives. Integrals of functions of several variables on bounded domains.

### Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	22	28	50
Problem solving	26	26	52
Practices through ICT	6	3	9
Problem and/or exercise solving	0	10	10
Problem and/or exercise solving	0	7	7
Essay questions exam	2	20	22

\*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

### Methodologies

	Description
Lecturing	The teaching staff will expose the theoretical bases of the subject. They will present possible applications, formulate problems, questions and exercises. They will propose tasks and activities oriented towards the methods and techniques to employ to carry them out.
Problem solving	Activity in which we will propose problems and/or exercises related with the subject. The student should develop the correct solutions by means of exercise of routines, the application of formulas or algorithms, the application of procedures of transformation of the available information and the interpretation of the results. It will be employed as a supplement of the lectures.
Practices through ICT	Activities oriented towards learning and handling mathematical computer programs, for calculus and graphical representation of functions and data.

### Personalized assistance

Methodologies	Description
Lecturing	Each student will request the teaching staff the clarifications that he/she sees fit for a better understanding of the subject and successfully develop the proposed tasks. These queries will be responded during the tutorials. The tutorial sessions will be able to be realized remotely having made a previous agreement with the professor.
Practices through ICT	Each student will request the teaching staff the clarifications that he/she sees fit for a better understanding of the subject and successfully develop the proposed tasks. These queries will be responded during the tutorials. The tutorial sessions will be able to be realized remotely having made a previous agreement with the professor.
Problem solving	Each student will request the teaching staff the clarifications that he/she sees fit for a better understanding of the subject and successfully develop the proposed tasks. These queries will be responded during the tutorials. The tutorial sessions will be able to be realized remotely having made a previous agreement with the professor.

### Assessment

	Description	Qualification	Training and Learning Results	
Problem and/or exercise solving	Each student should resolve given tasks during the time and under the conditions established by the teaching staff. These activities will be related to the first three lessons of the program and will be done during the class hours corresponding to Lecturing or Problem solving.	35	A1	D1
Problem and/or exercise solving	Each student should resolve given tasks during the time and under the conditions established by the teaching staff. These activities will be related to the last lessons of the program and to the handling of computer programs. It will be done during the class hours corresponding to Lecturing, Problem solving or Practices through ICT .	25	A1	D1

Essay questions exam	Final exam. It will include questions and exercises that the students will answer organizing and presenting the knowledge that they have on the subject.  It will take place on the official exam dates for each evaluation opportunity.	40	A1	B4	C21	D1
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### Other comments on the Evaluation

The final qualification of the subject (NF) will be computed by the formula:

$$NF = A + (10 - A)E/10$$

where A is the sum of the scores obtained by "Problem and/or exercise solving" (up to 6 points) and E is the "Essay questions exam" score (up to 10 points).

To pass the subject the final score has to be greater or equal to 5 points ( $NF \geq 5$ ). The students who fail to pass the subject on the first opportunity, and want to do it on the second one, will have to repeat the "Essay questions exam". The score obtained by "Problem and/or exercise solving" will be the same for the second opportunity.

The qualification NOT PRESENTED can not be given to a student who attended at least one of the final exams.

### Sources of information

#### Basic Bibliography

Adams, R. A., **Cálculo**, 6ª, Pearson, 2009

Besada, M.; García, J.; Mirás, M.; Quinteiro, C.; Vázquez, C., **Matemáticas para os graos de Ciencias**, Servicio de Publicacións. Universidade de Vigo, 2016

Larson, R.; Hostetler, R.; Edwards, B., **Cálculo esencial**, Cengage Learning, cop., 2010

Rogawski, J., **Cálculo: una variable**, 2ª, Editorial Reverté, 2016

Rogawski, J., **Cálculo: varias variables**, 2ª, Editorial Reverté, 2012

Steiner, E., **The Chemistry Maths Book**, Oxford University Press, 2008

#### Complementary Bibliography

### Recommendations

#### Subjects that continue the syllabus

Mathematics: Mathematics 2/V11G201V01108

#### Subjects that are recommended to be taken simultaneously

Biology: Biology/V11G201V01101

Physics: Physics I/V11G201V01102

Chemistry: Chemistry Lab I/V11G201V01105

Chemistry: Chemistry 1/V11G201V01104