



IDENTIFYING DATA

Mathematics: Mathematics I

Subject	Mathematics: Mathematics I			
Code	V10G061V01104			
Study programme	Grado en Ciencias del Mar			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Basic education	1st	1st
Teaching language	#EnglishFriendly Galician			
Department				
Coordinator	García Cutrín, Francisco Javier Alonso Álvarez, José Nicanor			
Lecturers	Alonso Álvarez, José Nicanor García Cutrín, Francisco Javier			
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General description	Mathematics I, in the degree of Grao in Sciences of the Sea, has as primary function to provide students with language, skills and basic mathematical techniques that will require both training and non-professional.			

In addition, it should contribute to develop logical reasoning for problem solving, data analysis skills, interpretation of results and synthesis of conclusions. Participation, collaboration and a critical spirit will be encouraged.

The understanding and management of the fundamental concepts and techniques of linear algebra and calculus will be sought, as well as its application to various areas of study of the marine environment.

English Friendly subject: International students may request from the teachers:
a) resources and bibliographic references in English, b) tutoring sessions in English, c) exams and assessments in English.

Training and Learning Results

Code	
A1	Students have demonstrated knowledge and understanding in a field of study that builds upon their general secondary education, and is typically at a level that, whilst supported by advanced textbooks, includes some aspects that will be informed by knowledge of the forefront of their field of study
A2	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
A3	Students have the ability to gather and interpret relevant data (usually within their field of study) to inform judgments that include reflection on relevant social, scientific or ethical issues
A4	Students can communicate information, ideas, problems and solutions to both specialist and non-specialist audiences
A5	Students have developed those learning skills that are necessary for them to continue to undertake further study with a high degree of autonomy
C1	know at a general level the fundamental principles of sciences: Mathematics, Physics, Chemistry, Biology and Geology.
C2	Acquire basic knowledge of mathematics (differential and integral calculation) and statistics.
D1	Develop the search, analysis and synthesis of information skills oriented to the identification and resolution of problems.
D2	Acquire the ability to learn autonomously, continuously and collaboratively, organizing and planning tasks over time.
D3	Understanding the meaning and application of the gender perspective in different fields of knowledge and in professional practice with the aim of achieving a more just and equal society.
D4	Ability to communicate orally and in writing in Galician language.
D5	Sustainability and environmental commitment. Equitable, responsible and efficient use of resources.

Expected results from this subject			
Expected results from this subject	Training and Learning Results		
Handle with ease techniques for calculating eigenvalues of a square matrix and determining the sign of a quadratic form. Solve problems in which it is necessary to apply the techniques above.	A1	C1	D1
	A2	C2	D2
	A3		D3
	A4		D4
	A5		D5
Understand some basic concepts of differential calculus: partial derivatives, continuously differentiable function, chain rule, implicitly defined function, extreme/optimal of scalar functions.	A1	C1	D1
	A2	C2	D2
	A3		D3
	A4		D4
	A5		D5
Use the mechanics of calculating partial derivatives of any order, applying the chain rule, deriving implicitly defined functions, as well as techniques for calculating optimal/extremes with and without equality constraints. Apply the previous techniques to solve optimization problems.	A1	C1	D1
	A2	C2	D2
	A3		D3
	A4		D4
	A5		D5
To know the primitives of elementary functions and the main techniques to calculate these. Understand the mechanics of calculating double integrals.	A1	C1	D1
	A2	C2	D2
	A3		D3
	A4		D4
	A5		D5
Handle the mechanics of calculation of primitives and double integrals of simple functions. Know how to apply integral calculus to determine areas, volumes, centers of gravity, moments of inertia, etc.	A1	C1	D1
	A2	C2	D2
	A3		D3
	A4		D4
	A5		D5
Use a symbolic calculation computer program to solve problems related to the subject.	A1		D1
	A2		D2
	A3		D3
	A4		D4
	A5		D5

Contents

Topic	
Matrix calculus	Operations with vectors in the plane and in space. The vector space R^n . Matrices and determinants. Basic operations with matrices and determinants. Discussion and resolution of systems of linear equations.
Differential calculus	Introduction to the functions of several variables. Differentiable functions. Chain rule. Implicit derivation. Extremes and conditional extremes of scalar functions.
Integral calculus.	Riemann integral. The fundamental theorem of integral calculus. Application to the calculation of areas.

Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	26	52	78
Problem solving	16	32	48
Practices through ICT	4	8	12
Essay questions exam	6	6	12

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

Methodologies

	Description
Lecturing	Exposure of the theoretical bases and orientation, by the teaching staff, on the contents of the subject.
Problem solving	Activities focused on work on a specific topic, which allow deepening or expanding the contents of the discipline. They will be used as a complement to the theoretical classes.
Practices through ICT	Use of a scientific calculator to help solve the exercises proposed in the seminars and master sessions. They take place in computer classrooms.

Personalized assistance

Methodologies	Description

Problem solving	Students who wish may attend personal tutorials to resolve doubts, mainly at the times indicated on the faculty website and/or on the MOOVI platform. In order to better optimize the procedure, the student is requested to contact the teacher in advance by email, with reasonable notice.
Practices through ICT	Students will demand from the teachers the clarifications they deem appropriate to better understand the subject and successfully carry out the proposed tasks. The individual work of the student will also be monitored.

Assessment						
	Description	Qualification	Training and Learning Results			
Problem solving	Test that will consist of theoretical questions and exercises that the student will answer by organizing and presenting, in an extensive way, the knowledge they have on the subject. There will be three tests, each counting 20 percent of the grade.	60	A1 A2 A3 A4 A5	C1 C2	D1 D2 D3 D4 D5	
Practices through ICT	Test in which students must solve some exercises using the computer program used in the classroom.	5	A5		D1	
Essay questions exam	It will be carried out as part of a final test that will take place at the end of the course, and will have a value of 35 percent of the final grade.	35	A1 A2 A3 A4 A5	C1 C2	D1 D2 D3 D4 D5	

Other comments on the Evaluation

Students who do not wish to follow the subject regularly may choose the global assessment option. The request for this option must be submitted at the time and in the manner determined by the Center, which will be published prior to the academic start. In the case of opting for the global evaluation, all the matter will be evaluated in a single test that will correspond to 100% of the final grade.

For the second opportunity, the students who follow the continuous evaluation will maintain the qualification obtained in it. For the remaining students, the test will correspond to 100% of the final grade.

2nd Opportunity: Students who follow the continuous assesment will mantein the grade obtained in it. For the remaining students the test will correspond to 100% of the final grade.

The date, time and place of the evaluation tests will be published on the official website of the Faculty of Marine Sciences: <http://mar.uvigo.es/alumnado/examenes/>

Students are strongly requested to fulfil a honest and responsible behaviour. It is considered completely unacceptable any alteration or fraud (i.e., copy or plagiarism) contributing to modify the level of knowledge and abilities acquired in exams, evaluations, reports or any kind of teacher's proposed work. Fraudulent behaviour may cause failing the course for a whole academic year. An internal dossier of these activities will be built and, when reoffending, the university rectorate will be asked to open a disciplinary record.

Sources of information

Basic Bibliography

Besada, M.; García, F.J.; Mirás, M.A.;Quinteiro, C.; Vázquez, C., **Un mar de matemáticas**, 2016

Larson, R.; Hostetler, R. e Edwards, B. H., **Cálculo (volumes I e II)**, MacGraw Hill, 2000

Complementary Bibliography

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

Besada, M.; García, J.; Mirás, M.; Quinteiro, C. e Vázquez, C., **Matlab: todo un mundo**, 2007

Besada, M.; García, J.; Mirás, M. e Vázquez, C., **Cálculo diferencial en varias variables**, Garceta, 2011

Besada, M.; García, J.; Mirás, M.; Quinteiro, C. e Vázquez, C., **Matemáticas para Química**, 2008

Recommendations

Subjects that continue the syllabus

Mathematics: Mathematics II/V10G061V01109