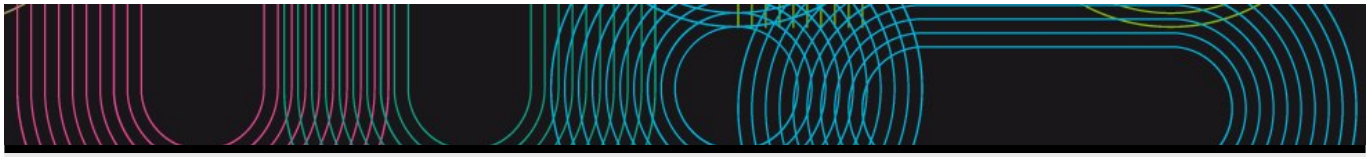

IDENTIFYING DATA				
Applied marine geology				
Subject	Applied marine geology			
Code	V10G060V01909			
Study programme	(*)Grao en Ciencias do Mar			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	4th	1st
Teaching language	Spanish Galician			
Department				
Coordinator	Gago Duport, Luís Carlos			
Lecturers	Díez Ferrer, José Bienvenido Francés Pedraz, Guillermo Gago Duport, Luís Carlos Méndez Martínez, Gonzalo Benito			
E-mail	duport@uvigo.es			
Web	http://http://webc10.webs.uvigo.es/ficha.php?id=16			
General description	It is a theoretical-practical subject that is directed to the integration of previous acquired geological knowledge, focusing its application on the study of geological risks, marine geological resources and advice in coastal engineering.			

Competencies	
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
A5	Students have developed those learning skills that are necessary for them to continue to undertake further study with a high degree of autonomy
C6	Ability to identify and understand the problems in the field of oceanography
C11	To manage the use of littoral and coastal region and their resources in a sustainable way
C13	To acquire, evaluate, process and interpret oceanographic data within the theories currently in use
C14	To recognize and analyze new problems and to propose problem-solving strategies
C16	To plan, design and implement applied research from the recognition stage to the final evaluation of results and discoveries
C20	To find and evaluate marine resources of various kinds
C26	To plan, direct and write technical reports on marine issues
C30	Identify and assess environmental impacts in the marine environment
C37	Technical advice or assistance on issues related to the marine and coastal environment
D1	Analysis and synthesis ability
D6	Problem management and solving skills

Learning outcomes			
Expected results from this subject	Training and Learning Results		
1. Know and locate the main marine geological resources	A1 A2 A3 A5	C6 C20	D1

2.- Know interpret and integrate geophisical and geological data in the exploration and prospection of marine geological resources	A1	C13 C20	D1 D6
3. Know the main geological risks sea coasts and submarines and the consequences	A3	C6 C14 C16 C30	D1
4. Geochemical modelling of pollution processes in the marine environment.	A2 A3	C11 C13 C16 C30 C37	D1
5. Realisation of geological reports.	A3	C14 C26 C30 C37	D1

Contents

Topic	
1-Introduction. (1 hour class).	1.0. Introduction.
2 - Coastal and submarine Geological Risks (GR). (6 hours class) (6 hours seminars) (8 hours field trip) (4 hours practical works)	Theory 2.1. Definition and types of coastal and submarine GR. 2.2. Coastal and submarine GR linked to the external geodynamics 2.3. Coastal and submarine GR linked to the internal geodynamics. 2.4. Changes in sea level. Field trip: Risks of coastal flood. Data collection. Practices: Geochemistry of marine pollution processes. Seminars 1, 2 and 3: Submarines volcanic risks and tsunamis.
3- Marine Geological Resources (11 hours class) (6 hours seminars)	Theory 3.1. Distribution and origin of the elements present in the sea and in the marine sediments. 3.2. Methods and technical of exploration and exploitation of marine geological resources. 3.3. Marine mineral resources (MMR). 3.3.1. Sediments no consolidated: Arid, placers deposits and salts. 3.3.2. deposits in nodules and crusts: Phosphorites, nodules and crusts of Fe-Mn. 3.3.3. Hydrothermal deposits. 3.4. Marine energetic resources (MER) and Geology of the Carbon. 3.4.1. Exploration and exploitation of hydrocarbons 3.4.2. Origin and interest of the hydrates of gas as resource. 3.5. Mechanisms of capture and transformation of the CO2 Seminars 4, 5 and 6: Resolution of practical exercises in relation to the exploration of hydrocarbons.
4 □ Impact of human activity in the coast. Marine geology and Society (8 hours field trip) (2 hours seminars)	Field Trip: Different coastal examples in which detailed geological studies are needed Seminar 7. Discussion on the treatment given to different past and present coastal geological problems.

Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	18	54	72
Seminars	14	28	42
Laboratory practical	4	12	16
Studies excursion	16	0	16
Essay questions exam	2	0	2
Problem and/or exercise solving	1	0	1
Problem and/or exercise solving	1	0	1

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

Methodologies

	Description
Lecturing	Theoretical classes
Seminars	Exhibition of practical cases. Resolution of exercises related. Debate.
Laboratory practical	Seawater pollution geochemistry
Studies excursion	Risks of coastal flood and data collection. Human activity in coasts, geological context analysis.

Personalized assistance

Methodologies	Description
Lecturing	Theoretical classes. Students willing so could attend personal tutorials to solve doubts and/or uncertainties, which will mainly take place during the timetables indicated. To better optimise the procedure, the student is requested to previously contact his/her teacher with reasonable anticipation
Seminars	Analysis of different topics related to the competences of the subject. Detailed instructions on how to report a file. Specialised Database query. Advise on the choice of a topic to develop in the report. Resolution of doubts through individualised tutoring. Students willing so could attend personal tutorials to solve doubts and/or uncertainties, which will mainly take place during the timetables indicated. To better optimise the procedure, the student is requested to previously contact his/her teacher with reasonable anticipation
Laboratory practical	Explanation and preparation of geological risk maps in coastal zones in small groups. Students willing so could attend personal tutorials to solve doubts and/or uncertainties, which will mainly take place during the timetables indicated. To better optimise the procedure, the student is requested to previously contact his/her teacher with reasonable anticipation
Studies excursion	Risk mapping. Data analysis of anthropic activity in the coast and its relationship with the geological environment. Students willing so could attend personal tutorials to solve doubts and/or uncertainties, which will mainly take place during the timetables indicated. To better optimise the procedure, the student is requested to previously contact his/her teacher with reasonable anticipation

Tests	Description
Essay questions exam	Part of the theoretical-practical test
Problem and/or exercise solving	Part of the theoretical-practical test
Problem and/or exercise solving	Part of the theoretical-practical test

Assessment

	Description	Qualification	Training and Learning Results		
Lecturing	Compulsory assistance	0			
Seminars	It will considered the participation on the seminars as well as the work performed on the different topics treated in the seminars. In the debate we will be evaluated the strenghing of the scientific arguments presented by each working group.	40	A1 A2 A3	C6 C30	D1
Laboratory practical	Assistance, participation and delivery of the memory.	10	A1 A3	C11 C13	D1 D6
Studies excursion	Assistance, participation and delivery of the report.	10	A3	C11 C13 C14 C20 C30	D1
Essay questions exam	Part of the theoretical-practical test.	30	A1 A5	C11 C20 C30 C37	
Problem and/or exercise solving	Part of the theoretical-practical test.	5	A1	C20 C30	D6
Problem and/or exercise solving	Part of the theoretical-practical test.	5	A2	C6 C11	D1 D6

Other comments on the Evaluation

The attendance to the theoretical classes, practices, seminars and field trips is obligatory. Students who do not attend seminars or practices may not submit the relevant reports and be presented to the overall assessment.

For a student to be considered "Not Presented" does not have to have been evaluated in any item.

The final exam, in any of the calls, will include any theoretical and/or practical aspects exposed during the course, including fieldtrips, practices and seminaries.

Ordinary call.

In order to pass the subject by **continuous evaluation** and to take the final written test that represents 40% of the mark, it will be necessary to exceed 40% of the mark in each and every evaluable items. Otherwise it is considered that the student goes to **global evaluation** and is presented to a single final written test for 100% of the score.

Extraordinary call

A single exam that counts 100% of the score.

Exam dates and classes can be viewed on the website of the Faculty of Marine Sciences.

Individualised tutoring

Tutoring schedules of teachers of the subject can be found on the TEMA platform.

Students are strongly requested to fulfil an 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

Beatley, T., **An Introduction to coastal zone management**, second edition, Island Press, 2002

Burns, R. (Ed.), **Marine Minerals. Reviews in Mineralogy, vol 6**, Mineralogical Society of America, 1979

Craig, J.R., Vaughan, D.J. & Skinner, B.J., **Recursos de la Tierra y el Medio Ambiente.**, 4ª Ed., Pearson Education, 2012

Cronan, D.S., (Ed.), **Marine Minerals in Exclusive Economics Zones**, Chapman & Hall, 1992

Earney, P.C.E., **Marine Mineral Resources**, Taylor & Francis, 2012

Complementary Bibliography

Couper, A., **The Times Atlas and Encyclopaedia of The Sea**, Times Book Ltd., 1989

Cronan, D.S., **Handbook of Marine Mineral Deposits**, CRC Press, 1999

Keller, E.A., Blodgett, R.H., **Riesgos Naturales: Procesos de la Tierra como riesgos, desastres y catástrofes**, Pearson Educación, 2007

Méndez, G., Rey, D., Bernabeu, A.M., Manso, F. y Vilas, F., **Recursos minerales marinos en la costa gallega y plataforma adyacente**, Journal Iberian Geology, 26, 2000

Seibold, E.; Berger, W.H., **The sea floor. An introduction to marine geology**, third Edition, Springer, 2010

Teleki, P.G, Dobson, M.R., Moore, J.R. & von Stackelberg, U. (Eds.), **Marine Minerals. Advances in Research and Resource Assessment**, Springer, 1987

Recommendations

Subjects that are recommended to be taken simultaneously

Marine contamination/V10G060V01701
Marine and coastal management/V10G060V01704

Subjects that it is recommended to have taken before

Geological oceanography I/V10G060V01504
Geological oceanography II/V10G060V01603

Contingency plan

Description

=== EXCEPTIONAL MEASURES SCHEDULED ===
In front of the uncertain and unpredictable evolution of the sanitary alert caused by the *COVID-19, the University of Vigo establishes an extraordinary planning that will activate in the moment in that the administrations and the own institution determine it attending to criteria of security, health and responsibility, and guaranteeing the teaching in a no face-to-face stage or partially face-to-face. These already scheduled measures guarantee, in the moment that was prescriptive, the development of the teaching of a more agile and effective way when being known in advance (or with a wide *antelación) by the students and the *profesorado through the tool normalised and institutionalised of the educational guides.

=== ADAPTATION OF THE METHODOLOGIES ===
educational Methodologies that keep

-Teoretical teaching and Seminars through the virtual classroom

educational Methodologies that modify :

-Field work:

Option 1. Geological journey accross the campus. Geomorphological description of the Vigo's ria view from the forest park.

Option. 2. Evaluation of the anthropic risks associated to various coastal places through the analysis of aerial photographies. Analysis of marine pollution through geochemical modelling

Laboratory practices:

- Laboratory teaching will be substituted by activities related with the use of computer programs by using free software.The installers will be placed in faitic.

Tutorials:

-Tutoríals will be done in the virtual office of the professors.

The seminars will be performed in the Virtual Classrooms and with the addtional use of questionnaires and exercises in FAITIC for the development of the associated practical activities (asynchronous way).

* Additional bibliography to facilitate the car-learning

* Other modifications

=== ADAPTATION OF THE EVALUATION ===

* Test assessment that keep unaltered :

Seminars: [previous Weight 40%] [Weight Proposed 40%]

* Test assessment that are modfied :

Practices of laboratory => practical Exercises in Faitic [previous Weight 10%] [Weight Proposed 10%]

Fiield work/virtual activities [previous Weight 10%] [Weight Proposed 10%].

-Theoretical-practical examination: Will be substituted by the realisation of written works realted to different theoretical topics. His assessment will be able to reach until 40% of the final note.

* New proofs:

Global Examination by telematic way

*Additional information

In the case of applying to the Global Evaluation, the physical classroom examination will be substituted by an Oral Examination (theoretical part) in the Virtual Classroom together with the resolution of Questionnaires in FAITIC (practical

part).