



## IDENTIFYING DATA

### Geological oceanography I

Subject	Geological oceanography I			
Code	V10G061V01303			
Study programme	(*)Grao en Ciencias do Mar			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	3rd	1st
Teaching language	Spanish			
Department				
Coordinator	Bernabéu Tello, Ana María			
Lecturers	Alejo Flores, Irene Bernabéu Tello, Ana María Marino , Gianluca			
E-mail	bernabeu@uvigo.es			
Web	<a href="http://193.146.32.240/tema1112/claroline/course/index.php">http://193.146.32.240/tema1112/claroline/course/index.php</a>			
General description	Geological oceanography (also called marine geology) is one of the broadest fields in the Earth Sciences and contains many subdisciplines, including geophysics, and plate tectonics, petrology and geochemistry, sedimentation processes, and micropaleontology and stratigraphy. Geological Oceanography I will focus on the study of basic earth proceses affecting sedimentation in litoral areas, since sediments are the main geological feature of these region. The subject will cover the fundamental techniques to study the topography, structure, sedimentation, and associated geological processes of these areas to discover how they were formed and how ongoing processes (coastal dynamics, climate change, human impact...) may change them in the future. The subject will deal with the peculiarity of combining terrestrial and marine data to study litoral and coastal processes.			

## 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
B1	Know and use vocabulary, concepts, principles and theories related to oceanography and apply everything learned in a professional and/or research environment.
B2	Plan and execute surveys in the field and laboratory work, applying basic tools and techniques for sampling, data acquisition and analysis in the water column, sea bottom and marine substratum.
B5	Develop, implement and write basic or applied projects in oceanography from a multidisciplinary perspective.
C12	Acquire knowledge about processes and products related to internal and external geological cycles.
C13	Acquire the basic sedimentological, geochemical and geophysical techniques and methodologies used in identification, use and sustainability of the natural resources of coastal and marine environmets.
C14	Know basic concepts and events of global change obtained from geological records.
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.
D5	Sustainability and environmental commitment. Equitable, responsible and efficient use of resources.

## Learning outcomes

Expected results from this subject	Training and Learning Results			
	A5	B2	C13	D1
2. Capacity to manage the basic techniques of observation, measurement and description of marine geological materials in these environments	A5	B2	C13	D1 D5
3. Capacity to manage the basic techniques of sampling and surveying	A1 A5	B1	C12 C13	D1
4. Capacity to manage the basic techniques of sediment characterization and analyses	A2 A5	B2	C12 C14	D1
5. Geological mapping and representation skills	A1 A2 A5	B1 B2	C12 C13	D1 D2
6. Report elaboration and presentation skills	A2 A3	B1	C12 C13	D2
New	A3 A5	B1 B5	C14	D1

## Contents

Topic	
T0. Presentation	0.1 Aims 0.2 Activities 0.3 Program 0.4 System of qualification
T1. Introduction	1.1 History and development of Marine Geology 1.2 Importance of Marine Geology
T2. General protocol for geological research on the coast and nearshore	2.1 Nature of Research and project design 2.2 General protocol for design and execution of a project 2.3 Planning and definition of methodological strategies 2.4 Data evaluation, interpretation and publication
T3. Coastal Morphodynamics	3.1 Basic concepts 3.2 Morphodynamics of coastal systems 3.3 Transport assessment
T4 Methods of sampling and subsampling	4.1 Grabbers 4.2 Corers 4.3 Fluids and gases 4.4 Samples curation
T5. Seismo-acoustic methods	5.1 Basic Principles 5.2 Echosounders 5.3 Side Scan Sonar 5.4 Seismic Methods (HR) 5.5 Processing
T6. Electrical logging: physical properties (seminars)	6.1 Gamma density and natural gamma 6.2 Resistivity and poropermeability 6.3 Susceptibility and other magnetic properties 6.4 Color and imaging 6.5 X-Rays 6.6 Corescanning: GEOTEK and 2G
T7 Geochemical Methods (seminars)	7.1 Elemental analyses 7.1.1 LECO 7.1.2 Spectrometry 7.1.3 XRF  7.2 Mineralogical Analyses 7.2.1 XRD 7.2.2 SEM-EDAX  7.3 Corescanning: ITRAX and AVAATECH
T8 Dating Techniques	8.1 Radiometry 8.1.1 14C 8.1.2 210Pb 8.1.3 137Cs  8.2 Other Methods 8.2.1 d18O 8.2.2 Magnetic 8.2.3 Thermoluminescence

PA1 Survey Planning	How to plan a cruise (practical case) PA1.1 Objective definition PA1.2 Selection of methodologies PA1.3 Definition of tasks and scope PA1.4 Time Planning PA1.5 Economic assessment and budgets PA1.6 Reports
PA2 RV Mytilus Mini Cruise	PA2.1 Administrative requirements and basic security norms in oceanographic cruises PA2.2 Onboard life PA2.3 Sediment sampling techniques and operations PA2.4 Geophysical surveying techniques and operations PA2.5 Data management and archives

<b>Planning</b>			
	Class hours	Hours outside the classroom	Total hours
Seminars	7	9	16
Studies excursion	5	5	10
Introductory activities	2	4	6
Case studies	15	30	45
Lecturing	23	48	71
Essay questions exam	2	0	2

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

<b>Methodologies</b>	
	Description
Seminars	2:20 h long seminars on complementary topics
Studies excursion	It includes ship minicruises oriented to experience oceanographic work in real conditions
Introductory activities	It comprises the activities carried out during the two first lectures, like subject presentation, time schedule, qualification procedures and other pertinent indications for the course well-being.
Case studies	Preparation of a project in real terms: analysis of the problematic, definition of aims, methodological planning, timing and economic estimate.
Lecturing	Lectures comprising the major topics of the course program

<b>Personalized assistance</b>	
Methodologies	Description
Lecturing	The tutorials will take place preferably on Monday and Thursday from 12:00 to 14:00 The tutoring sessions may be carried out by telematic means (email, videoconference, FAITIC forums, ...) under the modality of prior agreement. In the face-to-face modality, the tutorials will be held in office D42, block C, 3rd floor of the CC Experimental Building, as long as the teacher does not have to attend to other academic obligations. To optimize the time, it is necessary for the student to contact the teacher in advance
Seminars	The tutorials will take place preferably on Monday and Thursday from 12:00 to 14:00 The tutoring sessions may be carried out by telematic means (email, videoconference, FAITIC forums, ...) under the modality of prior agreement. In the face-to-face modality, the tutorials will be held in office D42, block C, 3rd floor of the CC Experimental Building, as long as the teacher does not have to attend to other academic obligations. To optimize the time, it is necessary for the student to contact the teacher in advance
Studies excursion	The tutorials will take place preferably on Monday and Thursday from 12:00 to 14:00 The tutoring sessions may be carried out by telematic means (email, videoconference, FAITIC forums, ...) under the modality of prior agreement. In the face-to-face modality, the tutorials will be held in office D42, block C, 3rd floor of the CC Experimental Building, as long as the teacher does not have to attend to other academic obligations. To optimize the time, it is necessary for the student to contact the teacher in advance
Introductory activities	The tutorials will take place preferably on Monday and Thursday from 12:00 to 14:00 The tutoring sessions may be carried out by telematic means (email, videoconference, FAITIC forums, ...) under the modality of prior agreement. In the face-to-face modality, the tutorials will be held in office D42, block C, 3rd floor of the CC Experimental Building, as long as the teacher does not have to attend to other academic obligations. To optimize the time, it is necessary for the student to contact the teacher in advance

Case studies	The tutorials will take place preferably on Monday and Thursday from 12:00 to 14:00 The tutoring sessions may be carried out by telematic means (email, videoconference, FAITIC forums, ...) under the modality of prior agreement. In the face-to-face modality, the tutorials will be held in office D42, block C, 3rd floor of the CC Experimental Building, as long as the teacher does not have to attend to other academic obligations. To optimize the time, it is necessary for the student to contact the teacher in advance
--------------	---

<b>Assessment</b>						
	Description	Qualification	Training and Learning Results			
Seminars	Individual written report on the seminar activities. May include tests.	10	A1 A2 A3 A5	B1 B5	C12	D1 D2
Studies excursion	It comprises an individual brief written summary. It has to reflect the activities performed in the field trip.	10	A2 A5	B1		D1 D5
Case studies	Group report that comprise the practical activities, including objectives, methodology, results and conclusions	10 ó 20	A2 A3 A5	B1 B5	C13 C14	D1 D2
Lecturing	Written individual test of 2 to 4 hours, whose aim will be the global evaluation of the process of learning and the acquisition of skills and knowledge. It will comprise one or several of the following types of assessments: long questions to elaborate, short questions, tests, problem resolution, interpretation of images, maps and diagrams. It will require a minimum of 4 over 10 to be able to compute with the rest of evaluation elements.	60	A1 A2 A3 A5	B1	C12 C13 C14	D1 D2
Essay questions exam	Individual written report on an additional activity derived from the lectures, practicals or seminars, pursuing the students own interest. It does not have compulsory character. Its execution takes 10% off the laboratory practicals.	10 ó 0	A3	B1	C12 C14	D1 D2

### Other comments on the Evaluation

The attendance to the field trip, seminars and practical is compulsory. A 20% or more of absence of attendance in the lectures or the non-attendance to a field trip will automatically disqualify. It is necessary to attain at least 40% of the maximum mark in each block to compensate. If one of the methodologies is not qualified, the final qualification will be the pure average divided by 2.

Students failing the course will have to retake all the parts the following year.

The official exam dates will be available at: <http://mar.uvigo.es/index.php/en/alumnado-actual-2/examenes-3>

The students are strongly asked to fulfill a honest and responsible behavior.

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

E.A. Hailwood, R. Kidd, **Marine Geological Surveying and Sampling**, 978-94-010-6763-8 (Print) 978-94-009-0615-0 (Online), Springer, 1990

E. J. W. Jones, **Marine Geophysics**, 978-0-471-98694-2, Wiley, 1999

Horst D. Schulz, Matthias Zabel, **Marine Geochemistry**, 978-3-540-32143-9 (Print) 978-3-540-32144-6 (Online), Springer, 2006

M. E. Tucker, **Techniques in Sedimentology**, 978-0632013722, Wiley-Blackwell, 1991

Bernabeu, A.M., Abilleira, P., Fernández-Fernández, S., Lersundi-Campistegui, A. V., **Capítulo XXIX. Métodos para la evaluación del transporte de sedimentos en el litoral. En: Métodos Y Técnicas En Investigación Marina**, 9788430952083, TECNOS, 2011

K Mohamed, D. Rey, **Capítulo XXX. Técnicas de magnetismo ambiental de utilidad en el estudio de sedimentos marinos. En: En: Métodos Y Tecnicas En Investigacion Marina**, 9788430952083, TECNOS, 2011

B. Rubio, D. Rey, A.M. Bernabeu, F. Vilas, I. Rodríguez Germade, A. Ares, **Capítulo XXXI. Nuevas técnicas de obtención de datos geoquímicos de alta resolución. En: Métodos Y Tecnicas En Investigacion Marina**, 9788430952083, TECNOS, 2011

---

### **Complementary Bibliography**

<http://walrus.wr.usgs.gov/pubinfo/margeol2.html>,

Comission of marine cartography, <http://www.shoa.cl/ica/index.html>,

GEODAS Geophysical Data Management System of the NOAA National Geophysical Data Center (NGDC),

<http://www.ngdc.noaa.gov/mgg/geodas/geodas.html>,

---

---

### **Recommendations**

#### **Subjects that continue the syllabus**

Geological oceanography II/V10G060V01603

---

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

Physical oceanography I/V10G060V01503

---

---

### **Other comments**

#### **DELIVERY OF ASSIGNMENTS**

Unless it is stated otherwise, all the hand outs have to be delivered in electronic format and uploaded to the TEMA platform. No email, or paper submission will be accepted or acknowledged.

#### **IMPORTANT**

All deadlines expire at 24:00 of the marked day.

#### **REGARDING THE AUTHORSHIP OF THE GROUP ASSIGNMENTS**

Submission of the assignment is the responsibility of the coordinator, who must state the participants. All coauthors must upload their copy at FAITIC to claim co-authorship.

Authorship cannot be modified after the deadline of the assignment.

Authors that appear in more than one assignment will cause the assignment to fail for all authors.

Plagiarism, partly or in whole, will cause course to fail and will be reported to the Dean for disciplinary action.

**THE TEMA PLATFORM IS THE OFFICIAL COMMUNICATION CHANNEL OF THE COURSE**

Any agreement has to be stated in the TEMA platform to be official.

---

---

### **Contingency plan**

#### **Description**

In the case of having to assume mixed teaching or teaching completely online, the training activities will be modified as follows:

1. Theoretical classes: they will be taught through the Campus Remoto
2. Practical classes: They will be taught through the Campus Remoto
3. Field trip: information and audiovisual resources will be given to students related to the content and learning outcomes associated with this methodology.
4. Seminars: They will be taught through Campus Remoto with additional supporting information

Regarding the assessment of the subject, it will be modified increasing the weight in the final grade of the continuous evaluation. The distribution of% will be as follows:

#### **1. Theoretical contents:**

Exam 20%

Continuous assessment 20%

#### **2. Practical content: 25%**

Group report reflecting the activities made during the practices, which will include objectives, methodology, results and conclusions

#### **3. Field trip: 15%**

Includes an individual written report of the

---

material and information provided

4. Seminars: 20%

Individual written report on the activity carried out in seminars. May include questionnaires.

---