



IDENTIFYING DATA

Chemical Oceanography

Subject	Chemical Oceanography			
Code	V10M153V01CF102			
Study programme	Máster Universitario en Oceanografía			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Optional	1st	1st
Teaching language	#EnglishFriendly Spanish			
Department				
Coordinator	Nieto Palmeiro, Óscar			
Lecturers	Nieto Palmeiro, Óscar			
E-mail	palmeiro@uvigo.es			
Web	http://masteroceanografia.com/			
General description	This subject is an introduction for those students that do not have previously studied chemical oceanography during the graduate and that will be used as a background for the following subjects in this master.			

Training and Learning Results

Code	
A1	Students who have demonstrated knowledge and understanding that is founded upon and extends and/or enhances that typically associated with the first cycle, and that provides a basis or opportunity for originality in developing and/or applying ideas, often within a research context
A5	Students who have the learning skills to allow them to continue to study in a manner that may be largely self-directed or autonomous.
B1	The students will understand in a detailed and based form the theoretical and practical aspects and the work methodology of the oceanography
D1	The students will know and will be able to apply the scientific method in the academic and research fields.
D4	The students will be able to understand the need and obligation to perform a continuous training, to a large extent autonomous, for the scientific development, updating the knowledges, skills and attitudes of the professional competences along the life.

Expected results from this subject

Expected results from this subject	Training and Learning Results
Establish the chemical composition of the water of sea, determining the mechanisms and factors that compose it.	A1 A5 B1 D1
Describe the balances of the chemical species and gases dissolved in oceanic waters, including climatic and thermodynamic considerations.	A1 A5 B1 D1 D4
Study the mechanisms of transfer between the interphases.	A1 A5 B1 D1 D4
Establish the global cycles of the elements	A1 A5 B1 D1 D4

Contents	
Topic	
Composition and stoichiometry of seawater.	Major components of the water of mar.
Concept of salinity.	Salinity: chlorinity and chlorosity.
Reactivity of the minor elements in seawater: vertical profiles and time of residence.	Classification of elements. Vertical profiles. Time of residence.
Chemical speciation.	States of oxidation. Natural complexes in seawater.
Solubility of the gases in seawater.	Composition of the atmosphere. Dissolved gases in the water column. Dissolved oxygen in seawater.
Chemistry of interstitial water	The diagenetic sequence and redox reactions in sediments. Inputs of chemical elements from the interstitial water to the oceans.
Biogeochemical cycles of the C and of the elements nutrients	Cycle of C

Planning			
	Class hours	Hours outside the classroom	Total hours
Introductory activities	0.5	0	0.5
Lecturing	17.5	25	42.5
Laboratory practical	6	0	6
Seminars	4	0	4
Essay questions exam	2	0	2
Report of practices, practicum and external practices	0	10	10
Essay	0	10	10

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

Methodologies	
	Description
Introductory activities	Brief presentation of the educational guide and of the development of the subject.
Lecturing	Exhibition of contents by part of the professor, analysis of competitions, explanation and demonstration of capacities, skills and knowledges in the classroom, using like methodology the participatory masterclass and in which the function of the professor is to explain the theoretical foundations of the matter.
Laboratory practical	Significant construction of the knowledge through the interaction the activity of the student. They are activities developed in spaces and with skilled equipment that improve the significant construction of the knowledge through the interaction and activity of the student. They realise in the laboratory and the function of the professor is to present the aims, orient the work and realise the follow-up of the same.
Seminars	Significant construction of the knowledge through a skilled meeting, of technical or academic nature, that tries to develop a deep study on the matter in question. The significant construction of the knowledge is active, since the students have to look for and elaborate the information in the frame of a reciprocal collaboration between himself and from the interaction with the professor.

Personalized assistance	
Methodologies	Description
Introductory activities	The student who wishes it will be able to attend personalized tutorials to solve doubts, mainly in the schedules indicated. To optimize the time, it is necessary for the student to contact the teacher well in advance. These tutorials can be done in person in the offices of the teachers or through the virtual offices that the teachers have in campusremotouvigo.gal . Likewise, any doubts that arise to the student can be formulated through the forums that are enabled for this on the Moovi platform.
Lecturing	The student who wishes it will be able to attend personalized tutorials to solve doubts, mainly in the schedules indicated. To optimize the time, it is necessary for the student to contact the teacher well in advance. These tutorials can be done in person in the offices of the teachers or through the virtual offices that the teachers have in campusremotouvigo.gal . Likewise, any doubts that arise to the student can be formulated through the forums that are enabled for this on the Moovi platform.
Laboratory practical	The student who wishes it will be able to attend personalized tutorials to solve doubts, mainly in the schedules indicated. To optimize the time, it is necessary for the student to contact the teacher well in advance. These tutorials can be done in person in the offices of the teachers or through the virtual offices that the teachers have in campusremotouvigo.gal . Likewise, any doubts that arise to the student can be formulated through the forums that are enabled for this on the Moovi platform.

Seminars The student who wishes it will be able to attend personalized tutorials to solve doubts, mainly in the schedules indicated. To optimize the time, it is necessary for the student to contact the teacher well in advance. These tutorials can be done in person in the offices of the teachers or through the virtual offices that the teachers have in campusremotouvigo.gal. Likewise, any doubts that arise to the student can be formulated through the forums that are enabled for this on the Moovi platform.

Tests	Description
Essay questions exam	The student who wishes it will be able to attend personalized tutorials to solve doubts, mainly in the schedules indicated. To optimize the time, it is necessary for the student to contact the teacher well in advance. These tutorials can be done in person in the offices of the teachers or through the virtual offices that the teachers have in campusremotouvigo.gal . Likewise, any doubts that arise to the student can be formulated through the forums that are enabled for this on the Moovi platform.

Assessment

	Description	Qualification	Training and Learning Results		
Essay questions exam	The student will have to answer in a succinct way to some questions in which it will evaluate the capacity to comprise and relate the concepts learnt during the subject.	40	A1 A5	B1	D1 D4
Report of practices, practicum and external practices	The students in group will present a memory of the work of practices realised in the laboratory and will be evaluated of agreement to some criteria that will be published as a rubric in the platform Moovi.	30	A1 A5	B1	
Essay	The students in group will present a memory of the work realised in the sessions of seminars and will be evaluated of agreement to some criteria that will be published as a rubric in the platform Moovi.	30	A1 A5	B1	D1 D4

Other comments on the Evaluation

The official dates for the evaluation tests can be found at the following links:

<http://masteroceanografia.com/horarios/>

Exámenes - Facultade de Ciencias do Mar (uvigo.es)

In order to surpass the whole subject, all and each one of the parts that compose the subject have to be surpassed with a minimum qualification of 5 points.

In case that any of the proofs of short answer and the resolution and of problems and/or exercises do not reach the minimum note, will repeat the examination in the second announcement.

In the case that it do not reach the minimum note in "Reports/memories of practice" and/or the "Jobs and projects", it will present again the work in the term that the professor estimate timely.

Sources of information

Basic Bibliography

Millero F.J. y Sohn M.L., **Chemical Oceanography**, 4ª edición, CRC Press, cop., 2013

Chester R. y Jickells T.D., **Marine geochemistry**, 3ª edición, Wiley-Blackwell, cop., 2012

Complementary Bibliography

Open University course team, **Seawater : its composition, properties and behaviour**, 1ª edición, Pergamon Press, 1991

Libes S.M, **Introduction to Marine Biogeochemistry**, 2ª edición, Academic Press, 2009

Riley J.P. y Chester R., **Introducción a la Química Marina**, 1º edición en castellano y ediciones en inglés, A.G.T., 1989

Recommendations

Subjects that continue the syllabus

Chemical Reactions in the Ocean/V10M153V01103

Other comments

The student who wishes, can attend personalized tutorials to solve doubts. To optimize the time, it is necessary for the student to contact the teacher well in advance.

Students are required to teach this subject, responsible and honest conduct. Any form of fraud (e.g. copying and/or

plagiarism) aimed at distorting the level of knowledge or skill achieved by students in any type of test, report or work designed for this purpose is inadmissible. Fraudulent conduct may be suspended during a full course. An internal register of these proceedings shall be kept in order to request the Rectorate to open disciplinary proceedings in the event of a repeat offence.
