# Universida<sub>de</sub>Vigo

## Subject Guide 2016 / 2017

IDENTIFYING DATA   Physical Oceanography   Subject Physical Oceanography   Code V10M153V01CF101   Study (*)Máster   programme Universitario en Oceanografía   Descriptors ECTS Credits   Choose Year   Quadmester   3 Optional   Teaching   language   Department   Coder Zesteira, Ramón Varela Benvenuto, Ramiro Alberto   Lecturers Álvarez Fernández, María Inés Castro Rodríguez, María Teresa de Gómez Gesteira, Ramón Varela Benvenuto, Ramiro Alberto   E-mail rvarela@uvigo.es   Web http://masteroceanografia.com/   General Acquisition of basic knowledges for the understanding of the main physical processes that occur in the oceal description   the field of the physical oceanography.					
Subject Physical Oceanography   Code V10M153V01CF101   Study (*)Máster   programme Universitario en Oceanografía   Descriptors ECTS Credits   Descriptors ECTS Credits   Code Optional   1st 1st   Teaching language Ist   Department Coordinator   Coordinator Varela Benvenuto, Ramiro Alberto   Lecturers Álvarez Fernández, María Inés Castro Rodríguez, María Teresa de Gómez Gesteira, Ramón Varela Benvenuto, Ramiro Alberto   E-mail rvarela@uvigo.es   Web http://masteroceanografia.com/   General Acquisition of basic knowledges for the understanding of the main physical processes that occur in the ocean description					
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		the field of the physical oceanography.			

Cor	npetencies
Cod	le
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.

Learning outcomes					
Expected results from this subject	Training and Learning Results				
Acquire basic knowledges to understand the physical processes that occur in the ocean.	A1				
	A5				
	B1				
	D1				
	D4				
Capacity to comprise the different scales space-temporary in which they operate the physical processes in A1					
the field of the physical oceanography.	A5				
	B1				
	D1				
	D4				
Use to level of initiation of the *Matlab	A5				

# Contents

Topic

Equation of state of seawater Continuity equation Navier-Stokes equations Ocean vorticity Waves in the ocean	Seawater physical properties. EOS-80 and TEOS-10 conventions. Boussinesq approximation, geostrophic balance, Ekman balance and transport. Understanding potential and total vorticity. Effects Main concept of wind waves. Classification of the oceanic waves. Tide origin. Tidal harmonic components Gravity waves in fluids. Deep and shallow water waves
CLIMATOLOGY	Electromagnetic radiation Simple heat balance in a water reservoir
HYDROGRAPHY	Surface distribution of salt and temperature Thermal and salt profiles in the water column Water masses. TS diagrams. Static and dynamic stability. The Richardson number
CURRENTS	Surface currents and the wind system. systems of winds. Western intensification. Geostrophic flow. Barotropic and baroclinic regimes. Dynamic topography. Ekman pumping. Convergences and divergences. Upwelling and downwelling.

Planning			
	Class hours	Hours outside the classroom	Total hours
Master Session	18	10	20
	10	10	20
Seminars	21	15	36
Autonomous troubleshooting and / or exercises	2	9	11
*The information in the planning table is for guidar	nce only and does no	ot take into account the het	erogeneity of the students.

Methodologies	
	Description
Master Session	Classical theoretical explanation/lecture.
Seminars	Real world examples questions and exercises to be solved with the teacher's help and by group discussion.
Autonomous troubleshooting and / or exercises	Exercises and problems to be solved individually at home

Personalized attention					
Methodologies	Description				
Master Session	Teacher's lecture on the corresponding subject, with a continuous interaction of the students to solve doubts about subjects of interest that can arise in this regard				
Seminars	Resolution of exercises and problems (all they extracted from real situations)				
Autonomous troubleshooting and / or exercises	Reports, exercises and complementary problems to be individually fulfilled				

Assessment						
	Description	Qualificat	ion		Training and Learning Results	
Master SessionExamination		60	A1	B1		D1
			A5			D4
Seminars	Reports to be evaluated individually	. 40	A1	B1		D1
			A5			D4

### Other comments on the Evaluation

Sources of information

VARELA R.A. y ROSÓN, G, Métodos en Oceanografía Física, Editorial Anthias,

PICKARD, G.L. y W. EMERY, Descriptive Physical Oceanography, Pergamon Press,

TOMCZCAK, M. y J. STUART GODFREY, Regional Oceanography: an introduction, Pergamon,

BROWN, J.,, Ocean circulation. Open University course Team, Pergamon press,

Stewart, Robert., Introduction to Physical Oceanography, Texas A&M University,

Periáñez, Raúl, Fundamentos de Oceanografía Dinámica, Univ. de Sevilla,

Malek-Madani, Reza, Physical Oceanography: A Mathematical Introduction with MATLAB, Chapman and Hall/CRC,

Recommendations						
Subj	jects	that	continue	the	syllabus	

Atmosphere-Ocean Interaction/V10M153V01207 Physical Processes in the Ocean/V10M153V01101

## **Other comments**

PREVIOUS REQUIREMENTS: The Educational Commission of the Master will study, for each student that do not proceed of the degree in Marine Science, the relevance that the student \*curse east Complement Formative in sight of his training and previous experience.