



IDENTIFYING DATA

Remote sensing

Subject	Remote sensing			
Code	V10G061V01413			
Study programme	Grado en Ciencias del Mar			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	4th	2nd
Teaching language	#EnglishFriendly Spanish			
Department				
Coordinator	Torres Palenzuela, Jesús Manuel			
Lecturers	Torres Palenzuela, Jesús Manuel			
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General description	Introduction to the physical principles of the Teledetection and his Oceanographic Applications. 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	
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
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.
B3	Recognize and implement good practices in measurement and experimentation, and work responsibly and safely both in field surveys and in the laboratory.
B4	Manage, process and interpret the data and information obtained both in the field and in the laboratory.
B5	Develop, implement and write basic or applied projects in oceanography from a multidisciplinary perspective.
C1	know at a general level the fundamental principles of sciences: Mathematics, Physics, Chemistry, Biology and Geology.
C4	Know, analyze and interpret the physical properties of the ocean according to current theories, as well as to know the most relevant sampling tools and techniques.
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.

Expected results from this subject

Expected results from this subject	Training and Learning Results			
Learn to use programs of Treatment of Images of Satellite in marine applications.	A2	B1	C1	D1
	A3	B2	C4	D2
Work with thermal images, optical and of microwaves in studies of *batimetría coastal, currents and oceanic twists, classification of covers in coastal zone, algorithms of colour and follow-up of poured of hydrocarbons.	A4	B3		
	A5	B4		
		B5		

Contents

Topic

1.-INTRODUCTION To THE Objective	1.1.- Teledetection in Oceanography 1.2.- Brief history of the space observation of the oceans 1.3.- Possibilities for the oceanography 1.4.- Temporary and space scales of the phenomena of interest.
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TELEDETECTION

Pretend with this first subject enter to the student in the world of the teledetection and the paper that this plays in the modern oceanography.

2.- PHYSICAL PRINCIPLES OF THE Objective	Contents
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TELEDETECTION

In this unit pretends that the student know the principles of the physics of the electromagnetic radiation, his interaction with the atmosphere and the ocean, as well as the spectral characteristics of the covers.

2.1.- Radiation and electromagnetic spectrum.
2.2.- Terms and units of measure.
2.3.- Principles of the electromagnetic radiation.
2.4.- *Caractrísticas Spectral of the covers.
2.5.- Interaction of the atmosphere with the radiation.
2.5.1.- Absorption.
2.5.2.- Dispersion.
2.5.3.- Broadcast.

3.- ELEMENTS OF A SYSTEM OF Objective	Contents:
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TELEDETECTION:

In this unit enters to the student in the characteristics that define to a sensor and space platform and airlifted as well as the steps required from the capture of an image by a sensor until his application and utilisation by part of an user. Finally they describe the most used satellites.

3.1. System of reception of images Elements of the system Platform and sensor Orbits Resolution of a sensor Types of sensors Platforms *satelitales and airlifted. Photography *aerea and *Drones

4.- *ANALISIS And DIGITAL TREATMENT OF Objective	Contents:
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IMAGES:

In this unit establish the principles of visual and digital interpretation as well as the processing of the information with the object to delete errors (correction), improve some appearance of the information obtained (enhance) or obtain other parameters from the data of radiance (transformations). Finally it will enter to the student in the digital classification and the integration of information in systems of geographic information.

4.1. Visual analysis 4.1.1. Criteria of Interpretation 4.2. Digital treatment 4.2.1. Digital image 4.2.2. Corrections 4.2.3. It enhance 4.2.4. Transformations
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5.- APPLICATIONS	Aims:
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- Colour of the Ocean
- Temperature
- Poured and Pollution
- Red Tides and Phytoplankton
- Oceanic Circulation
- polar Thaw
- Studies of Choral
- fluvial Feathers

In this last unit enumerate the applications of the teledetection in meteorology and study of the oceans. In each one of these applications makes a description of the physical principles that make it possible, as well as the interpretation of the results obtained and the sensors used.

Planning

	Class hours	Hours outside the classroom	Total hours
Practices through ICT	20	10	30
Seminars	7	15	22
Lecturing	15	40	55
Mentored work	4	10	14

Problem and/or exercise solving	1.7	5	6.7
Presentation	0.3	10	10.3

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

Methodologies

	Description
Practices through ICT	The methodology that uses in the practical is the one of study directed.
Seminars	It will make a follow-up *individualizado of technicians and contents for the development of the works scheduled . His main aim is to clear the concepts that have been explained in the class of theory or resolve any of the problems of the practical classes.
Lecturing	The lesson *magistral is the method mainly employee, using in the measure of the possible the lesson had a conversation.
Mentored work	The/The student, of individual way or in group, elaborates a document on the thematic of the matter or prepares seminars, investigations, memories, essays, summaries of readings, conferences, etc.

Personalized assistance

Methodologies	Description
Lecturing	The lesson *magistral is the method mainly employee, using in the measure of the possible the lesson had a conversation. The student that wish it will be able to attend to *tutorías personalised to resolve doubts, mainly in the schedules that indicate . To optimise the time, is necessary that the student contact with the professor with *antelación sufficient
Practices through ICT	The methodology that uses in the practical is the one of study directed.
Seminars	It will make a follow-up *individualizado of technicians and contents for the development of the works scheduled . His main aim is to clear the concepts that have been explained in the class of theory or resolve any of the problems of the practical classes.
Mentored work	It will be evaluated the work by means of an oral presentation, a theoretical work and a specific practice

Assessment

	Description	Qualification	Training and Learning Results
Practices through ICT	The methodology that uses in the practical is the one of study directed. They are of compulsory assistance.	15	A2 B2 C4 D2 A3 B3 A4 B4
Seminars	It will make a follow-up *individualizado of technicians and contents for the development of the works scheduled. The seminars are of compulsory assistance.	10	A2 B2 C1 D1 A3 B3 C4 D2
Lecturing	The lesson *magistral is the method mainly employee, using in the measure of the possible the lesson had a conversation. Some activities will be of compulsory assistance. The students will receive previous notifications for this assistance through *moovi.	5	A2 B1 C1 D1 A3 B3 C4 D2 A4
Mentored work	The/The student, of individual way or in group, elaborates a document on the thematic of the matter or prepares seminars, investigations, memories, essays, summaries of readings, conferences, etc. This work and his presentation can be substituted by a theoretical and practical proof in assessment of the professor.	30	A2 B2 C4 D1 A4 B3 A5 B4 B5
Problem and/or exercise solving	The problems are related with the capacity of the student purchased in the practices and the theory. They are of compulsory character.	30	A2 B2 C4 D1 A5 B3 B4
Presentation	Exhibition by part of the students in front of the educational and/or a group of students of a subject on contents of the matter or of the results of a work, exercise, project... Can carry out of individual way or in group.	10	A2 B1 C4 D1 A3 B4 A4 B5

Other comments on the Evaluation

Continuous evaluation:

The realisation of works (30%) and his exhibition (10%) can be substituted by a theoretical and practical examination with the great percentage *d 40% of the final note. This option will be valued by the professor to surpass the subject.

Some masterclasses will have *caracter *obligatorio given the practical content of the same. This will notify with sufficient *antelación through the web *Moovi to the students enrolled.

The date, hour and place of realisation of the proofs of evaluation, as well as the compulsory activities will be published in

the web of *moovi of the subject.

Global evaluation and Extraordinary Announcement:

The application for this option of evaluation will have to present in the time and form that determine the Centre, that will be published prior to the academic start.

Given the experimental character of the activities, the assistance to the same is compulsory to be able to opt to this option of evaluation.

The no assistance to practices, classes *obliatorias and seminars, without cause justified invalidates this possibility, as well as the opportunity of extraordinary evaluation (2ª opportunity).

So much the practices like the seminars, work *tutelado and the final evaluation have to have approved with 40% of the partial note of each one.&*nbsp; In case of suspense the second opportunity (extraordinary announcement) will make with an examination of objective questions and an examination of problems with the percentage adds of the no surpassed proofs.

Other considerations

Requires of the students that *curse this matter a responsible and honest behaviour. It considers inadmissible any form of fraud (copy or plagiarism) directed to *falsear the level of knowledges and skills reached in all type of proof, report or work. The fraudulent behaviours will be able to suppose suspend the subject during a complete course. It will carry an internal register of these performances so that, in case of *reincidencia, request the opening to the rectorship of a disciplinary file

Sources of information

Basic Bibliography

Oceanografía y Satélites, Tebar, 2009

CRACKNELL, A.P. u HAYES, L.W.B., **Introduction to Remote Sensing**, Taylo & Francis, 1991

Complementary Bibliography

Recommendations

Subjects that are recommended to be taken simultaneously

Geographic analysis methods/V10G061V01409

Other comments

The date, hour and place of realisation of the proofs of evaluation, will be published in the official web of the Faculty of Sciences of the Sea:

<http://mar.uvigo.es/alumnado/examenes/>