Information about the subject

Degree: Bachelor of Degree in Marine Sciences

Faculty: Faculty of Veterinary Medicine and Experimental Sciences

Code: 272008 **Name:** Geographic Information Systems and Remote Sensing

Credits: 6,00 **ECTS Year:** 2 **Semester:** 1

Module: Transversal Knowledge and Techniques in Marine Sciences

Subject Matter: Geographic Information Systems and Remote Sensing **Type:** Compulsory

Department: Oceanography and Environment

Type of learning: Classroom-based learning

Languages in which it is taught: Spanish

Lecturer/-s:

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Module organization

Transversal Knowledge and Techniques in Marine Sciences

Subject Matter	ECTS	Subject	ECTS	Year/semester
Organisms and Systems	30,00	Marine Botany	6,00	2/2
		Marine Ecology	6,00	3/2
		Marine Microbiology	6,00	2/2
		Marine Zoology	6,00	2/1
		Physiology of Marine Organisms	6,00	2/2
Marine Geology	12,00	Geophysics and Tectonics	6,00	2/1
		Sedimentology	6,00	2/2
Geographic Information Systems and Remote Sensing	6,00	Geographic Information Systems and Remote Sensing	6,00	2/1
Statistics	6,00	Applied Statistics	6,00	2/1

Learning outcomes

At the end of the course, the student must be able to prove that he/she has acquired the following learning outcomes:

R1   The student understands the map as a source of information, instrument of analysis and means of expression. He/she can use the different scales correctly.

R2   The student seeks information (cartographic, bibliographic, legislation) from different sources and knows how to analyse it from a critical point of view.

R3   The student creates and uses Geographic Information Systems (its components and functions) as a tool for analysis and management of the coastal and marine environment.

R4   The student creates and uses Geographic Information Systems (its components and functions) as a tool for analysis and management of the coastal and marine environment.

R5   The student applies the Geographic Information Systems as an instrument of territorial planning in the marine and coastal environment.

R6   The student interprets and recognizes the topographic map as a basic cartographic element.

Competencies

Depending on the learning outcomes, the competencies to which the subject contributes are (please score from 1 to 4, being 4 the highest score):

BASIC		Weighting			
		1	2	3	4
CB2	Students are able to apply knowledge to their work in a professional way and have the competences enabling them to state and defend views and opinions as well as perform problem-solving tasks in their field of study.				x
CB5	Students develop the necessary learning skills to undertake further studies with a high level of autonomy.				x

GENERAL		Weighting			
		1	2	3	4
CG1	Capacity to analyze and synthesize				x
CG2	Capacity to organize and plan			x	
CG3	Mastering Spanish oral and written communication		x		
CG5	Knowing and applying Basic ITC skills related to marine science				x
CG6	Capacity to manage information (capacity to look for and analyze information coming from different types of sources)				x
CG7	Decision making				x
CG8	Capacity to work in interdisciplinary and multidisciplinary team			x	
CG10	Critical and self-critical capacity				x
CG11	Capacity to learn				x
CG12	Capacity to adapt to new situations			x	

		1	2	3	4
CG13	Capacity to produce new ideas (creativity)			x	
CG16	Capacity to apply theoretical knowledge				x
CG18	Sensibility to environmental issues.		x		

SPECIFIC		**Weighting**			
		1	**2**	**3**	**4**
CE2	Knowing basic sampling techniques of water column, organisms, sediment and sea-bottoms as well as basic techniques of dynamic and structural variable measurement	x			
CE6	Applying marine instrument techniques			x	
CE7	Collecting, assessing, processing and interpreting oceanographic data, following the most recent theories	x			
CE8	Identifying and analyzing new problems and proposing solution strategies			x	
CE9	Knowing how to carry out experiments and measurements both in the laboratory and during sample collection	x			
CE10	Knowing how to use planning, designing and implementing research tools while surveying and assessing results				x
CE11	Knowing how to do fieldwork and laboratory experiments in a safe and responsible way, promoting teamwork	x			
CE12	Describing, classifying and mapping sea bottoms and coastal areas				x
CE13	Looking for and assessing different kinds of marine resources	x			
CE20	Mastering practical use of models, including new data for validation, improvement and development of models				x
CE22	Practical experience of methods of marine environmental impact assessment	x			

Assessment system for the acquisition of competencies and grading system

Assessed learning outcomes	Granted percentage	Assessment method
	40,00%	Written test with theoretical and practical questions
	20,00%	Delivery of guided assignments, whose objectives and contents will be proposed by the teacher
	30,00%	Problem-solving and issues related to the use of specific software
	10,00%	Oral presentation

Observations

* Minimum 50% on each item to average with the rest.** The evaluation of the item "**Problem solution with specific software**" will be done by using the ARcGis during the written test

MENTION OF DISTINCTION:
According to Article 22 of the Regulations governing the Evaluation and Qualification of UCV Courses, the mention of "Distinction of Honor" may be awarded by the professor responsible for the course to students who have obtained, at least, the qualification of 9 over 10 ("Sobresaliente"). The number of "Distinction of Honor" mentions that may be awarded may not exceed five percent of the number of students included in the same official record, unless this number is lower than 20, in which case only one "Distinction of Honor" may be awarded.

Learning activities

The following methodologies will be used so that the students can achieve the learning outcomes of the subject:

M1   Teacher presentation of contents, analysis of competences, explanation and in-class display of skills, abilities and knowledge.

M2   Group work sessions supervised by the professor. Case studies, diagnostic tests, problems, field work, computer room, visits, data search, libraries, on-line, Internet, etc. Meaningful construction of knowledge through interaction and student activity.

M3   Activities carried out in spaces with specialized equipment.

M4   Supervised monographic sessions with shared participation.

M5   Application of multidisciplinary knowledge.

M6   Personalized and small group attention. Period of instruction and/or guidance carried out
          by a tutor to review and discuss materials and topics presented in classes, seminars,
          readings, papers, etc.

M8   Set of oral and/or written tests used in initial, formative or additive assessment of the
          student.

M9   Group preparation of readings, essays, problem-solving, seminars, papers, reports, etc.
          to be presented or submitted in theoretical , practical and/or small-group tutoring
          sessions. Work done on the university e-learning platform (www.plataforma.ucv.es)

IN-CLASS LEARNING ACTIVITIES

	LEARNING OUTCOMES	HOURS	ECTS
ON-CAMPUS CLASS M1	R1, R2, R5, R6	16,00	0,64
PRACTICAL CLASSES M2	R2, R3, R4	36,00	1,44
SEMINAR M4	R2, R3	2,00	0,08
GROUP PRESENTATION OF ASSIGNMENTS M5	R3, R4	2,00	0,08
TUTORIAL M6	R3, R4	2,00	0,08
ASSESSMENT M8	R1, R2, R3, R4, R5, R6	2,00	0,08
TOTAL		**60,00**	**2,40**

LEARNING ACTIVITIES OF AUTONOMOUS WORK

	LEARNING OUTCOMES	HOURS	ECTS
GROUP WORK M9	R2, R3, R4, R5	18,00	0,72
INDEPENDENT WORK M8, M9	R1, R2, R3, R4, R5, R6	72,00	2,88
TOTAL		**90,00**	**3,60**

Description of the contents

Description of the necessary contents to acquire the learning outcomes.

Theoretical contents:

Content block	Contents
DIDACTIC UNIT I: LEGAL FRAMEWORK OF REGULATIONS	Legal, environmental and territorial tools that rule the establishment of a purification / desalination plant in a littoral district (Gandia).
DIDACTIC UNIT II: CARTOGRAPHICAL LANGUAGE AND MAP CONSTRUCTION.	Maps, kinds and series of maps. Geoid, coordinate systems, the scale, projection systems. Geographic and UTM coordinates and how to read them. Use and interpretation of thematic and topographic maps. Official Cartography in Spain. Elements in a map.
DIDACTIC UNIT III: GEOGRAPHIC INFORMATION SYSTEMS.	Components of a GIS. GV-GIS. Raster and vector structures, databases. Applications of vector and raster models. Digital models and their application to littoral and marine environments. Map layouts
DIDACTIC UNIT IV: GIS FUNCTIONS.	Information input and storage, transformation of raster / vector data, space analysis and modeling. The cartographical model.
DIDACTIC UNIT V: AERIAL AND SPACE REMOTE SENSING	Physical principles, photogrametry and photo-interpretation, Earth observation satellites, image digital treatment.

Organization of the practical activities:

	Content	Place	Hours
PR1.	PRACTICES: Visit astronomical laboratory. Conference on Earth in the Solar System. Meteorites.	Technical visit	3,00
PR2.	PRACTICES: Excursion. Objective: To recognize the field elements mapped with GIS	Field visit	6,00
PR3.	PRACTICES: Implementing and mapping using Geographic Information Systems (GVSIG) of a project on the installation of a water purification plant in the TM Gandia.	Computer	32,00

Temporary organization of learning:

Block of content	Number of sessions	Hours
DIDACTIC UNIT I: LEGAL FRAMEWORK OF REGULATIONS	2,00	4,00
DIDACTIC UNIT II: CARTOGRAPHICAL LANGUAGE AND MAP CONSTRUCTION.	5,00	10,00
DIDACTIC UNIT III: GEOGRAPHIC INFORMATION SYSTEMS.	3,00	6,00
DIDACTIC UNIT IV: GIS FUNCTIONS.	15,00	30,00
DIDACTIC UNIT V: AERIAL AND SPACE REMOTE SENSING	5,00	10,00

References

BARRETT, E.C., K.A. BROWN y A.MICALLEF (Eds.). 1991.Remote Sensing for Hazard Monitoring and Disaster assessment: Marine and Coastal applications in the Mediterranean Region. London: Gordon and Breach, 240p.

BOSQUE SENDRA, J. ESCOBAR MARTÍNEZ, F. J., GARCÍA HERNÁNDEZ, E. y COMAS, D. Y

BURROUGH, P.A. y R.A. McDONELL. 2000. Principles of Geographical Information Systems, Oxford University Press, 333 p.

BURROUGH,P.A., McDONNELL,R.A. 2000: Principles of Geographical Information Systems Oxford University Press, Oxford, 333 pp.

CHUVIECO, E. 2002. Teledetección ambiental: la observación de la Tierra desde el espacio Ed. Ariel, 586p.

CLARKE, K.C. 2003. Getting Started with Geographic Information System. ED. Prentice Hall. Nueva York (USA).

KANG-TSUNG CHANG. 2008. Introduction to Geographic Information Systems. McGraw Hill.

LONGLEY, P.A., GOODCHILD, M.F., MAGUIRE, D.J., RHIND, D.W. 2001. Geographic Information Systems and Science John Wiley & sons, Chichester, 454 pp.

OLAYA, V. 2016. Sistemas de Información Geográfica. 854 p.

RANI, M. SEENIPANDI, K., REHMAN S., KUMAR, P., SAJJA, H. 2020. Remote Sensing of Ocean and Coastal Environments. Elsevier, 426 pp.

RUIZ, E. 1993. Fundamentos de los Sistemas de Información Geográfica, Ed. Ariel Geografía, Barcelona.

SLOCUM, T.A., Mc MASTER, R.B., KESSLER, F.C., HOWARD, H.H. 2005. Thematic Cartography and Geographic Visualization. 2ª E. Upper Saddle River, NJ: Prentice Hall.

TABOADA GONZÁLEZ, J.A. y COTOS YÁÑEZ, J.M. 2005. Sistemas de información medioambiental Ed. Netbiblo

Algunas web útiles:

INSTITUTOS CARTOGRAFICOS:
Instituto Geográfico Nacional-IGN: www.ign.es
Instituto Cartográfico Valenciano-ICV: www.gva.es/icv

RECURSOS CARTOGRAFICOS online:
Google Earth
www.maps.google.com
www.maps.live.com
www.terraserver.com
www.mapquest.com
www.goolzoom.com

SISTEMAS DE INFORMACION GEOGRAFICA online
SIG-Comunidad Valenciana: Conselleria de Medio Ambiente, Urbanismo, Agua y
Vivienda: www.cma.gva.es/intro.htm
SIG –Visor de Costas. Conselleria de Infraestructuras y Transporte
    SIG Oleicola: www.mapa.es/es/sig/pags/sigpac/intro.htm
    SIGPAC: http://sigpac.mapa.es/fega/visor/
    SIG del IGN: http://www.ign.es/iberpix/visoriberpix/visorign.html
    SIG SIGA: http://sig.marm.es/siga/

IMÁGENES SATÉLITES
    earth.esa.int/ew
    visibleearth.nasa.gov

Asociaciones profesionales
Asociación Española de Teledetección (AET): (http://telenet.uva.es).
Sede social: C/ Pinar 25, 28006 Madrid
Asociación Geógrafos Españoles (AGE) : Grupo de Métodos Cuantitativos, SIG y
Teledetección http://www.age.es

Addendum to the Course Guide of the Subject

Due to the exceptional situation caused by the health crisis of the COVID-19 and taking into account the security measures related to the development of the educational activity in the Higher Education Institution teaching area, the following changes have been made in the guide of the subject to ensure that Students achieve their learning outcomes of the Subject.

Situation 1: Teaching without limited capacity (when the number of enrolled students is lower than the allowed capacity in classroom, according to the security measures taken).

In this case, no changes are made in the guide of the subject.

Situation 2: Teaching with limited capacity (when the number of enrolled students is higher than the allowed capacity in classroom, according to the security measures taken).

In this case, the following changes are made:

1. Educational Activities of Onsite Work:

All the foreseen activities to be developed in the classroom as indicated in this field of the guide of the subject will be made through a simultaneous teaching method combining onsite teaching in the classroom and synchronous online teaching. Students will be able to attend classes onsite or to attend them online through the telematic tools provided by the university (videoconferences). In any case, students who attend classes onsite and who attend them by videoconference will rotate periodically.

In the particular case of this subject, these videoconferences will be made through:

| X | Microsoft Teams |

| X | Kaltura |

Situation 3: Confinement due to a new State of Alarm.

In this case, the following changes are made:

1. Educational Activities of Onsite Work:

All the foreseen activities to be developed in the classroom as indicated in this field of the guide of the subject, as well as the group and personalized tutoring, will be done with the telematic tools provided by the University, through:

| X | Microsoft Teams |

| X | Kaltura |

Explanation about the practical sessions:

In the case of a new state of alarm, technical visits to the Astronomy Laboratory, Natural History Museum of the Universitat of Valencia and the Aula Natura" in Gandía will be moved to new dates, as soon as the health situation allows. As a non-face-to-face alternative, they will be replaced by virtual visits through Google Earth and by visits to official websites.

2. System for Assessing the Acquisition of the competences and Assessment System

ONSITE WORK

Regarding the Assessment Tools:

| X | The Assessment Tools will not be modified. If onsite assessment is not possible, it will be done online through the UCVnet Campus. |

| | The following changes will be made to adapt the subject's assessment to the online teaching. |

Course guide		Adaptation	
Assessment tool	Allocated percentage	Description of the suggested changes	Platform to be used

The other Assessment Tools will not be modified with regards to what is indicated in the Course Guide.

Comments to the Assessment System: