



Universidad  
de Huelva

# Grado en CIENCIAS AMBIENTALES

Curso 2020/2021



## GRADO EN CIENCIAS AMBIENTALES

### DATOS DE LA ASIGNATURA

ASIGNATURA	GEOGRAPHIC INFORMATION SYSTEMS	SUBJECT	GEOGRAPHIC INFORMATION SYSTEMS
CÓDIGO	757709202		
MÓDULO	MATERIAS INSTRUMENTALES	MATERIA	SISTEMAS DE REPRESENTACIÓN CARTOGRÁFICA
CURSO	1º	CUATRIMESTRE	2º
DEPARTAMENTO	HISTORÍA, GEOGRAFÍA Y ANTROPOLOGÍA	ÁREA DE CONOCIMIENTO	ANÁLISIS GEOGRÁFICO REGIONAL
DEPARTAMENTO	HISTORÍA, GEOGRAFÍA Y ANTROPOLOGÍA	ÁREA DE CONOCIMIENTO	GEOGRAFÍA FÍSICA
CARÁCTER	BÁSICA	CAMPUS VIRTUAL	MOODLE

### DISTRIBUCIÓN DE CRÉDITOS

	TOTAL	TEÓRICOS GRUPO GRANDE	TEÓRICOS GRUPO REDUCIDO	PRÁCTICAS DE INFORMÁTICA	PRÁCTICAS DE LABORATORIO	PRÁCTICAS DE CAMPO
ECTS	6	0	0	6	0	0

### DATOS DEL PROFESORADO

#### COORDINADOR

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CAMPUS VIRTUAL MOODLE

### DESCRIPCIÓN GENERAL DE LA ASIGNATURA

#### DESCRIPCIÓN GENERAL

Los Sistemas de Información Geográfica (SIG) forman un conjunto de métodos, procedimientos y herramientas que manejan de manera completa información espacial. Están destinados a la resolución de problemas de planificación y gestión del territorio y del medioambiente, pero también a la investigación, especialmente en el ámbito de las Ciencias de la Tierra. La Ciencia de la Información Geográfica (GISci) es la teoría académica que está detrás del uso y desarrollo de la tecnología SIG. En esta asignatura abordaremos en entorno informático los fundamentos de los SIG con el manejo de información de diversas fuentes (IGN, IECA, IGME, etc.), especialmente a partir de geoportales e Infraestructuras de Datos Espaciales (IDE), el aprendizaje de métodos y herramientas de análisis espacial (vectorial y ráster) y de procedimientos para el diseño y elaboración de cartografía temática. Esta materia obligatoria de primer curso se desarrolla de forma completa con docencia práctica en aulas de informática.

#### ABSTRACT

The Geographic Information Systems (GIS) form a set of methods, procedures and tools that fully manage spatial



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information. They are intended for solving problems of spatial planning and management of the environment, but also for research, especially in the field of Earth Sciences. The Science of Geographic Information (GISci) is the academic theory that is behind the use and development of GIS technology. In this subject we will approach in a computer environment the fundamentals of GIS with the management of information from various sources (IGN, IECA, IGME, etc.), especially from geoportals and Spatial Data Infrastructures (SDI), learning methods and spatial analysis tools (vector and raster) and procedures for the design and preparation for thematic cartography. This compulsory subject of the first course is developed completely with teaching practice in computer labs.

## OBJETIVOS: RESULTADOS DEL APRENDIZAJE

To make a first approach to Geographic Information Systems (GIS) will allow the students to have one of the basic tools for the knowledge, analysis and management of the territory, of the natural resources, location analysis of human activities, monitoring and simulation of environmental impacts or risk prevention. They will also be able to approach the overall concept of this discipline and the development of GIS projects.

Specific objectives (developed from the general objective)

Cognitive: Approach GIS as a discipline, and know, understand, analyze and relate the different sources of Geographic Information (Cartography, Remote Sensing, Geodatabases). Know and understand the main software available for the management of geographic information.

Procedural/instrumental: Create and manage a GIS approaching the user/consultant level, as well as develop and apply spatial analysis tools. Develop a GIS project to solve complex territorial and environmental problems, creating final analytical products and representations of results through graphic and cartographic techniques.

Attitudinal: Development of a global vision of work and an organized, methodical, analytical and critical attitude towards it.

## REPERCUSIÓN EN EL PERFIL PROFESIONAL

It is intended that the future graduate acquires the basic knowledge to analyse and relate the different sources of geographic information, as well as to approach the level of GIS consultant and to steer the system, by applying spatial analysis tools, towards their ultimate goal: to develop analytical products for the resolution of spatial problems. These are objectives that you will find regularly in the development of your professional practice in the field of Earth Sciences, Environment and Territory, both in the public and private sectors.

## RECOMENDACIONES AL ALUMNADO

This subject is composed only of computer groups (maximum 27 people), and therefore will only be developed in the computer classrooms of the Pérez Quintero Building of the Campus of El Carmen. It is important to have a storage device (pendrive type) for exclusive use in GIS of at least 8 Gb.

## COMPETENCIAS

### COMPETENCIAS BÁSICAS

### COMPETENCIAS GENERALES

### COMPETENCIAS TRANSVERSALES

### COMPETENCIAS ESPECÍFICAS

## TEMARIO Y DESCRIPCIÓN DE LOS CONTENIDOS

### PRÁCTICAS DE INFORMÁTICA

#### Block I. The geographical information (24 hours)

The Science of the Geographical Information (GIScience). Conceptualization and functionality of a SIG. Problems that a SIG can solve. The project SIG and his(her,your) typical phases. The first contact with ArcGIS: potential, modules (ArcMap and ArcCatalog), tools (ArcToolbox) and extensions. The nature of the geographical information. The components spatial and thematic. The structure of the information in caps. The models of information ráster and vectorial. The topología. The models of representation of elevations(increases) (MDT). The visualization of the geographical and alphanumeric information and management of information in ArcCatalog and ArcMap.Sources(Fountains) of geographical and territorial information. The direct and derivative images. The summary of the information: spatial Databases of reference, the DERA (IECA). The Network(Net) of environmental information of Andalusia (REDIAM). The CORINE Land Cover (CLC), the MUCVA and the SIOSE. The geoinformación in Internet: visors and centers of unload, infrastructures of spatial information (IDE); services OGC.The cartography like basic source(fountain) of geographical information and instrument of territorial analysis. The cartographic design: language and elements of the map. Qualitative and quantitative symbolization. The design of maps in ArcMap.Capture and integration of the geographical information. Digital formats (images, shapefiles and geodatabases). Systems of spatial reference. Methods of georreferenciación. Digitalization and edition of geodatos.

#### Block II. The analysis, alphanumeric and spatial of the geographical information. Principal operations of vectorial calculation and ráster (24 hours)

Alphanumeric analysis. The storage of the thematic information and the relational model of information. The selective search of information: the consultations SQL and the selections for spatial location. Union and relation of information, thematic and for location. Creation and managing of thematic databases from ArcCatalog and ArcMap.Spatial Vectorial analysis. Local operations. Geographical selection, extraction and overlapping. The spatial and thematic reclassification of the information. The tools of geoprosesamiento in ArcMap: personal details (Merge and Dissolve), extraction (Paper clip and Select) and of Overlay or overlapping (Union and Intersect). Operations of proximity: Generation and analysis of areas of influence or Buffers.Spatial analysis Ráster. Models Digitales of the Area (MDT): Calculation of orientations, earrings(slopes) and digital shading. Algebra and reclassification ráster.

#### Block III. Applications of the Information systems Geographical (12 hours)

Applications of the environment and of the georrecursos: changes in the uses of the soil, management of natural resources, analysis of the landscape, capacity and environmental impact, natural risks. Accomplishment of analysis in the dynamics temporary space of the uses of the soil and accomplishment of maps of aptitude of the territory in the area of Andalusia.Applications in the territorial planning.

### METODOLOGÍA DOCENTE

Prácticas de informática

- Exposiciones audiovisuales.
- Estudio de casos.
- Resolución de ejercicios y problemas.
- Realización de proyectos.
- Aprendizaje autónomo.
- Aprendizaje cooperativo.
- Atención personalizada a los estudiantes.

### CRONOGRAMA ORIENTATIVO I

SEMANAS (S):	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15
GRUPO GRANDE															
GRUPO REDUCIDO															
PRÁCTICAS DE LABORATORIO															
PRÁCTICAS DE INFORMÁTICA	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
PRÁCTICAS DE CAMPO															

## EVALUACIÓN DE LA ASIGNATURA

### PRIMERA EVALUACIÓN ORDINARIA (FEBRERO/JUNIO)

#### EVALUACIÓN CONTINUA

The subject has a continuous evaluation in which three categories can be distinguished.

The first of these consists of two practical tests to be developed during the course in class hours (to be performed using the corresponding GIS software), which will correspond to Blocks I and II of the curriculum. The practical nature of the material and the method of continuous evaluation used prevents these two tests from being considered as partial evaluations in which matter is eliminated. Some aspects will be valued only in one of the two tests, but much of the content is inevitably taken into account in both. Each of these tests will be assessed with 35% of the subject (70%). The grades obtained in both will give the average, regardless of the rating obtained in each of them. This part will be exceeded with 5/10 points, but the minimum note to average with the rest of the continuous evaluation is 4/10 points. If these practical tests are passed, but the Final Report is not submitted or suspended, the qualification can be reserved until the ordinary call II, if the student so wishes. Since the Faculty of Experiments reserves default classrooms and dates for the final evaluation in June, teachers will be able to use this schedule for the second evaluation test.

Second, coinciding temporarily with the second of the practical tests, students will be asked to deliver the material produced in class (maps, charts, databases and any other). This material will be valued at 10% of the subject.

Third is the preparation of a Final Report which will consist of the resolution of an adapted case of type GIS project valued with 20% of the overall qualification of the subject. The procedure is provided with a detailed outline of the steps to follow, which will be carried out in class. Pupils will have to prepare a short report that will include a map of the results obtained and a document with justification of the procedures, methodologies and tools used. The contribution of any further steps in the analysis of this case to refine the conclusions will be assessed. This work corresponds to Block III, considered as a compendium of the methods and techniques learned, and is mandatory, obtaining at least a 3/10 grade as a requirement to pass the subject. The qualification of the Final Report may be kept until ordinary call II, if the student so wishes.

#### EVALUACIÓN FINAL



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The general or final evaluation process will be carried out in the official call for students who request it through the procedure established by the University of Huelva at the beginning of the quarter. It shall also consist of three parts to be delivered on the date of examination established by the Faculty of Experimental Sciences:

A practical test to be carried out using the corresponding GIS software consisting of exercises that may refer to Blocks I and II. This test will constitute 70% of the final rating. The minimum note to average with the rest of the sections of the final evaluation is 4/10 points. If this practical test is passed but the Final Report is not delivered or suspended, the qualification can be reserved until ordinary call II, if the student or student so wishes.

The delivery of a set of materials produced by the student during the study of the subject (maps, charts, databases and any other), valued with 10% of the final grade.

The delivery of a Final Report that will constitute an adapted case of type GIS project valued with 20% of the final rating. Through the moodle platform students will be provided with a detailed outline of the steps to follow. Pupils will have to prepare a short report that will include a map of the results obtained and a document with justification of the procedures, methodologies and tools used. The contribution of any further steps in the analysis of this case to refine the conclusions will be assessed. This work corresponds to Block III, considered as a compendium of the methods and techniques learned, and is mandatory, having to obtain at least a 3/10 score as a requirement to overcome the subject. The qualification of the Final Report may be saved for ordinary call II, if the student so wishes.

Pupils who need to use this type of assessment are encouraged to attend regular tutorials.

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¿Contempla una evaluación parcial?

NO

## SEGUNDA EVALUACIÓN ORDINARIA

Pupils who have not passed the continuous evaluation or the final single evaluation will have a second ordinary call. This will be similar to the final single evaluation with the proviso that those students who have passed any of the three parts in the Ordinary Call I will not have to present themselves to the parties approved in this Ordinary Call II. In no case shall the approved parts be kept for ordinary convocation III or subsequent courses.

## TERCERA EVALUACIÓN ORDINARIA Y OTRAS EVALUACIONES

Students returning to the subject will have a third ordinary call, although only two of them will be eligible.

It shall also consist of three parts to be delivered on the date of examination established by the Faculty of Experimental Sciences:

A practical test to be carried out using the corresponding GIS software consisting of exercises that may refer to Blocks I and II. This test will constitute 70% of the final rating. The minimum note to average with the rest of the sections of the final evaluation is 4/10 points.

The delivery of a set of materials produced by the student during the study of the subject (maps, charts, databases and any other), valued with 10% of the final grade.

The delivery of a Final Report that will constitute an adapted case of type GIS project valued with 20% of the final rating. Through the moodle platform students will be provided with a detailed outline of the steps to follow. Pupils will have to prepare a short report that will include a map of the results obtained and a document with justification of the procedures, methodologies and tools used. The contribution of any further steps in the analysis of this case to refine the conclusions will be assessed. This work corresponds to Block III, considered as a compendium of the methods and techniques learned, and is mandatory, having to obtain at least a 3/10 score as a requirement to overcome the subject.

Pupils who need to use this type of assessment are encouraged to attend regular tutorials.

## OTROS CRITERIOS DE EVALUACIÓN

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¿Contempla la posibilidad de subir nota una vez realizadas las pruebas?

NO

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### Requisitos para la concesión de matrícula de honor

Academic degree with honor will be granted to students with better grades provided they pass the overall rating of 9.

## REFERENCIAS

### BÁSICAS

- CHUVIECO, E. (2010): Teledetección ambiental. Barcelona: Ariel
- MORENO JIMÉNEZ, A. (Coord.) (2005): Sistemas y Análisis de la Información Geográfica. Madrid: Ra-Ma.
- OLAYA, V. (2013): Sistemas de Información Geográfica. <http://volaya.github.io/libro-sig/>
- ROBINSON, A. H. et alia (1995): Elements of Cartography. New York: Wiley.
- SANTOS PRECIADO, J.M. (2004): Sistemas de Información Geográfica. Madrid: UNED

### ESPECÍFICAS

- BOSQUE, J. (1997): Sistemas de Información Geográfica. Rialp, Madrid.
- HARLEY, J.B. (2005): La nueva naturaleza de los mapas. Ensayos sobre la historia de la cartografía. Fondo de Cultura Económica. México
- JOLY, F. (1988): La cartografía. Ariel, Barcelona. MITCHELL, A. (2005): The ESRI Guide to GIS Analysis, Vol. 2: Spatial measurements and statistics. Redlands (CA)-USA. OJEDA ZÚJAR, J. (2000): "Andalucía: el conocimiento del territorio andaluz"; en Mapping, nº 59. pp. 40-42.
- SANTOS PRECIADO, J.M. (2002): El tratamiento informático de la información geográfica. UNED. Madrid.
- SANTOS PRECIADO, J.M. Y COCERO MATESANZ, D. (2006): Los SIG raster en el campo medioambiental y territorial. Ejercicios prácticos con MiraMon e Idrisi. Cuaderno de Prácticas, UNED. Madrid.

### OTROS RECURSOS

- [orbemapa.com/](http://orbemapa.com/)
- [net/carto/](http://net/carto/)
- [geographos.com/BLOGRAPHOS/](http://geographos.com/BLOGRAPHOS/)
- [mappinginteractivo.com](http://mappinginteractivo.com)
- [upv.es/es/inicio](http://upv.es/es/inicio)
- [mapasnet.com](http://mapasnet.com) [arcgis.com](http://arcgis.com)
- [cartesia.org](http://cartesia.org)
- <http://www.juntadeandalucia.es/medioambiente/site/rediam>
- <http://www.juntadeandalucia.es/institutodeestadisticaycartografia>