

**COURSE DATA****Data Subject**

<b>Code</b>	44307
<b>Name</b>	GIS applications in palaeontology
<b>Cycle</b>	Master's degree
<b>ECTS Credits</b>	3.0
<b>Academic year</b>	2022 - 2023

**Study (s)**

<b>Degree</b>	<b>Center</b>	<b>Acad. year</b>	<b>Period</b>
2200 - M. U. en Paleontología Aplicada	Faculty of Biological Sciences	1	Second term

**Subject-matter**

<b>Degree</b>	<b>Subject-matter</b>	<b>Character</b>
2200 - M. U. en Paleontología Aplicada	5 - Management of palaeontological heritage	Optional

**Coordination**

<b>Name</b>	<b>Department</b>
RUIZ SANCHEZ, FRANCISCO JAVIER	200 - Geology

**SUMMARY**

Geographic Information Systems or GIS applications (GIS in the Catalan meaning), are used as tools for the treatment of all kinds of information related to the surface of a land. And not only this, these tools transcend the space of topography and approach other fields of study, now the theoretical morphology or the interpretation of the form of the set or the parts of a living being. This subject therefore seeks to bring the student closer to the understanding and use of these tools in the study and management of the territory from the aspect of paleontological heritage, and on the other hand, it proposes the student to delve into new concepts and challenges around the organic form and GIS tools. Thinking of students with a very reduced training, or almost no in the use and management of GIS tools, this subject proposes to deepen from the initial stages of the computer tool, and gradually go deeper into it, until you have a sufficient domain to allow you the proportionate and directed use of these tools. Apart from professional payment applications, the course will be developed in the field of free software, being the working applications, GVSig and QGIS programs. In this subject, the student will learn to use the existing vector cartographic information (topographic, geological, etc.) and, on the other hand, will learn to generate from previous information (inventories, paleontological databases, information collected in the field, etc.) cartographies implementable in GIS programs. Based on this information the student should be able to use it in the management of paleontological heritage and in the elaboration of all types of thematic cartographies.



## PREVIOUS KNOWLEDGE

### Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

### Other requirements

No enrolment restrictions have been specified for other subjects in the curriculum.

Basic knowledge of Excel and Word applications (Microsoft Office) and basic geolocation concepts (coordinates, maps, etc.).

## OUTCOMES

### 2200 - M. U. en Paleontología Aplicada

- Students should apply acquired knowledge to solve problems in unfamiliar contexts within their field of study, including multidisciplinary scenarios.
- Students should be able to integrate knowledge and address the complexity of making informed judgments based on incomplete or limited information, including reflections on the social and ethical responsibilities associated with the application of their knowledge and judgments.
- Students should communicate conclusions and underlying knowledge clearly and unambiguously to both specialized and non-specialized audiences.
- Students should demonstrate self-directed learning skills for continued academic growth.
- Be able to access to information tools in other areas of knowledge and use them properly.
- Be able to communicate and disseminate scientific ideas.
- Ser capaces de trabajar en equipo con eficiencia en su labor profesional o investigadora, adquiriendo la capacidad de participar en proyectos de investigación y colaboraciones científicas o tecnológicas
- Ser capaces de realizar una toma rápida y eficaz de decisiones en situaciones complejas de su labor profesional o investigadora, mediante el desarrollo de nuevas e innovadoras metodologías de trabajo adaptadas al ámbito científico/investigador, tecnológico o profesional en el que se desarrolle su actividad.
- Aplicar el razonamiento crítico y la argumentación desde criterios racionales.
- Aplicar la Ciencia desde la óptica social y económica, potenciando la transferencia del conocimiento a la Sociedad.
- Capacidad para preparar, redactar y exponer en público informes y proyectos de forma clara y coherente, defenderlos con rigor y tolerancia y responder satisfactoriamente a las críticas que pudieren derivarse de su exposición.



- Projectar la inquietud intelectual y fomentar la responsabilidad del propio aprendizaje.
- Asumir el compromiso ético y la sensibilidad hacia los problemas medioambientales, hacia el patrimonio natural y cultural.

## LEARNING OUTCOMES

In this subject the student will learn to use and relate vector cartographic information and raster for the achievement of objectives in the fields of research and management of paleontological heritage. To do this, the student will learn to select the cartographic information contained in the Spanish and European vectorial and cartographic mapping servers, as well as to generate it on their own, from the field or as a result of the analysis of this information. The purpose is to be able to integrate it into a GIS project from which to extract information of interest or different types of thematic cartography for use in reports, planning, etc

## DESCRIPTION OF CONTENTS

### 1. Introduction, general concepts on geo-referencing and base mapping

Topic 1.- Environmental Information. Typologies. Coordinate Systems. Basic Concepts on Georeferencing. Geographic Information Systems. Software. Cartographic information implementable in a GIS. Official sources of information: Registration and use, CNIG, IGME, Ministerio de Medio Ambiente (MAGRAMA), Institut Cartogràfic Valencià (ICV). Downloads.

### 2. Computer module

Topic 3.- Structure of a GIS: Views, Tables, Layouts, etc. Information implementation. Data structure (tables).

Topic 4.- Data selection processes and creation of new information topics based on the original information. Creating new layers of information from Views and geo-referenced media elements.

Topic 5.- Development of information layers from information collected in the field. Data matrices. Event layers. Implementation in GIS.

Topic 6.- Spatial relations between layers of information (Topics). Procedures for data selection based on relationships between layers of information. Outcome: usefulness, similarities and differences between types of selection procedures.

Topic 7.- Creation of new information layers from buffer analysis. Complex territorial analyses based on relationships between base vector mapping information (topographic-geological) and derived information.

Topic 8.- GIS analysis applied to paleontological heritage evaluations for its management, territorial planning, reporting, selection of areas of action and evaluation of projects.



## WORKLOAD

ACTIVITY	Hours	% To be attended
Laboratory practices	26,00	100
Theory classes	4,00	100
<b>TOTAL</b>	<b>30,00</b>	

## TEACHING METHODOLOGY

### Theoretical and practical classes

- Master lessons with computer presentations
- Face-to-face case work
- Development and consultation of databases with teacher's guidance
- Preparation of reports with teacher's guidance on legislative case studies
- Exhibition and public defence of group work
- Controls
- Tests and examinations

### Practical classes of laboratory-cabinet (computer)

- Introduction and planning of each practice
- Monitoring, data collection, information collection
- Evaluable individual work:
- Development and consultation of databases with teacher's guidance

Preparation of reports



## EVALUATION

The evaluation of the subject matter shall be carried out by means of two tests. On the one hand, an individual test to be carried out in the computer classroom, in which the student/student must solve a practical case related to paleontological heritage and obtain a series of results. And, on the other hand, a second test consisting in the preparation of a report, coordinated with the subject of Management and Conservation of the Paleontological Heritage, on the establishment of a Site of Geological Interest (LIG) within the Alencian Community or other territory of interest.

The weight (percentage on the final grade) of the aspects considered in the evaluation of the subject are reflected in the following table:

Evaluation activities	Weighing
Test in computer room	50%
LIG report	50%

## REFERENCES

### Basic

- Introducing geographic information systems with ArcGIS a workbook approach to learning GIS. Kennedy, M. Hoboken : John Wiley & Sons, 2009.
- Iniesto, M. y Núñez, A. 2014. Introducción a la infraestructura de datos espaciales. Foro de Ingeniería en Geomática y Topografía del Grupo de Trabajo de la IDEE. Descarga gratuita en: <http://www.ign.es/ign/layoutIn/libDigitalesPublicaciones.do#resp-libro-IDEE>
- Navarro Jover, J.M. 2005. Prácticas de SIG con Arcview. Editorial Universidad Politécnica de Valencia.
- Navarro Jover, J.M. 2009. Prácticas de SIG con ArcGIS. Universidad Politécnica de Valencia. Servicio de Publicaciones, 2009
- SIG sistemas de información geográfica. Gutiérrez Puebla, J., Gould, M. Madrid : Síntesis, D.L. 1994
- SIG y localización óptima de instalaciones y equipamientos. Bosque Sendra, J. Paracuellos de Jarama : RaMa , D.L. 2004





### Additional

- <http://www.gvsig.com/>
- <http://training.esri.com/gateway/index.cfm?fa=search.results&CourseTypeID=1>
- <http://www.gabrielortiz.com/>
- MappingGIS (<http://mappinggis.com/2012/06/tutoriales-sig-gratis/>)
- <http://www.wiley.com/legacy/wileychi/gis/Home.html>
- <http://edugvsig.blogspot.com/>
- Centro Nacional de Información Geográfica. Centro de descargas (<http://centrodedescargas.cnig.es/CentroDescargas/>).
- Institut Cartogràfic Valencià (<http://www.icv.gva.es/>)
- <http://inspire-geoportal.ec.europa.eu/>