

Geographical Information Systems

Code: 104239

ECTS Credits: 6

2025/2026

Degree	Type	Year
Contemporary History, Politics and Economics	OT	3
Contemporary History, Politics and Economics	OT	4

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Teachers

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Teaching groups languages

You can view this information at the [end](#) of this document.

Prerequisites

None.

Objectives and Contextualisation

Theoretical and practical subject that provides an introduction to the field of Geographic Information Systems (GIS). One of the main objectives is to gain a good knowledge of how to deal with and analyse the located data on the land, by consolidating the theoretical aspects and the use of specific programs. The objective of teaching Geographic Information Systems is to gain some knowledge based on the conceptual and methodological basis. When finishing this subject, students need to know how to apply the acquired abilities to the needs required in other subjects through the consolidation of both the theoretical and practical aspects that have been developed. This implies knowing not only how to use GIS, but also to understand what is done when we work with them and why they are used.

Therefore, a double objective related to the theoretical and practical content of the subject is set: The conceptual context around GIS and all the abilities that require the use of GIS. At a general level, the main aim is to know and understand what GIS are, why they are used, how they work and when you need to use them.

At a conceptual level, the following objectives are set:

- Understanding the nature of geographic information and the tools needed for its use
- Knowing and understanding the two data structures used for modelling the reality

- Knowing how to introduce, structure and store geographic information, as well as the main handling and analysis functions of GIS
- Knowing the main data sources of GIS
- Understanding and knowing how to make the most of information systems as a tool to obtain answers to specific types of questions
- Knowing what types of actions are correct in each case in order to solve specific needs
- Gaining practical experience in solving problems typically found in the field

In the second case, the acquisition of skills, it is expected to provide students with the methodological tools that enable them to use GIS so they know what can be done, how it can be done and where it can be applied:

- Understanding and knowing how to make the most of information systems as a tool to obtain answers to specific types of questions
- Knowing what types of actions are correct in each case in order to solve specific needs
- Gaining practical experience in solving problems usually found in the geographic and territorial field.

From the objectives defined before, we are aiming to achieve a continuous interaction between theory and practice.

Competences

Contemporary History, Politics and Economics

- Analyse the sociodemographic, geoeconomic and environmental dynamics at different territorial scales.
- Distinguish between and analyse the type of relations that have been established over the last century among the different social, political and economic agents on national, regional and international frameworks.
- Relate fundamental questions of the current economic situation with previous economic developments on the basis of the main elements of contemporary economic history.
- Students must be capable of applying their knowledge to their work or vocation in a professional way and they should have building arguments and problem resolution skills within their area of study.
- Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethical relevant issues.
- Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.

Learning Outcomes

1. Apply GIS for understanding territorial, economic, social and historical phenomena.
2. Consider problems of inequality, population distribution and urbanisation in the world, among other things.
3. Contrasting and comparing several interpretations of geographical maps. And differentiate between different cartographical information systems.
4. Describing the spatial relationships, on different territorial scales, of the physical, economic, social and cultural territorial diversity.
5. Explaining the structure of today's world from a geographical point of view.
6. Students must be capable of applying their knowledge to their work or vocation in a professional way and they should have building arguments and problem resolution skills within their area of study.
7. Undertake basic image processing, from their acquisition to their use for category-type thematic cartographical use.

Content

Block 0: GIS background

GIS History

Definition, components and GIS functions

Block 1: Geographic information

Information on the land and on phenomena in the land

Geographic and non-geographic organisations

Nature of the geographic information

The value of georeferenced information

Block 2: Data models in GIS

Raster model

Vector model

Data sources and publishing on the Internet

Block 3: Introduction to GIS use. Spatial analyst

Cartographic modelling and analysis

Proximity analysis

Block 4: Georeference

Localisation as a connecting factor

Basic georeference methods

Main reference systems

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
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Type: Directed			
Lectures with IT support	15	0.6	
Practical tasks in class guided by the teachers / Guidelines for developing the practical tasks	29	1.16	
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Type: Supervised			
Individual and collective work tutored by teachers	25	1	
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Type: Autonomous			
Creation of practical tasks using specific programs and the recommended bibliography. Self-study	75	3	
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The contents of the subject will be developed through the following activities:

- Oral presentations by the teaching staff.
- Reading complementary articles in the syllabus (individual activity of the students complementary to the classroom work, which will be evaluated in the theoretical exams).
- Class practices guided by the teaching staff.
- Sequence of individual and/or small group class practices.

In this subject, it is essential to bring a pen drive with at least 2 GB of capacity to class.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continuous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
1 Theory exams	30%	3	0.12	6
2 Practical exams	30%	3	0.12	1, 3, 7
3 Practical exercises delivered throughout the course	40%	0	0	1, 3, 4, 5, 7, 2, 6

The continuous assessment activities are:

- Mid-term theory exams (30%): there will be two partial theoretical exams, one halfway through the course and the other at the end of the course. The grades of these two exams will be averaged between them without a minimum grade.
- Mid-term practical exams (30%): there will be two partial Practical exams, one halfway through the course and the other at the end of the course. The grades of these two exams will be averaged between them without a minimum grade.
- Practical exercises (40%): 4/5 practical exercises will have to be delivered during the course. The planned delivery schedule will be presented at the beginning of the course.
- Class attendance and participation: will be counted based on small activities carried out in class without prior notice. It can contribute up to 1 additional point to the final grade.

The average between the grade of the theoretical exam (average of the two theoretical parts) and the grade of the practical exam (the average of the two practical parts) is only computed if a minimum grade of 4 is reached in both parts, and students will only pass the exams if the average of their qualifications is at least a 5. It is mandatory to hand in the practical exercises. Students cannot take an exam if all the practical exercises have been delivered. An extraordinary delivery date will be defined for the practical tasks not delivered within the originally established deadline, or delivered on time but suspended. Practical exercises delivered within this extraordinary period will be scored with a maximum grade of 5.

On carrying out each evaluation activity, lecturers will inform students (on Moodle) of the procedures to be followed for reviewing all grades awarded, and the date on which such a review will take place.

This subject/module does not incorporate single assessment.

RESIT EXAM

Once the ordinary assessment has been completed, students will have the opportunity to take a resit exam within the dates scheduled by the Faculty. To participate in this exam the students must have been previously evaluated in a set of activities whose weight is equivalent to a minimum of 2/3 of the total qualification of the subject.

NOT EVALUATED

If the student has not delivered anything, not attended to any laboratory session and not done any exam, the corresponding result will be "Not assessed". In any other case, "not delivered" counts as a 0 for the weighted average that will be maximum a 4.5. Therefore, if students participate in an evaluated activity, it implies taking into account the "not delivered" in other activities as zeros.

FIRST CLASS HONOURS

First class honours will be awarded to those students that obtain a result of 9.5 or over in each part, up to 5% of those registered following a descending order of the final result.

REPEAT STUDENTS

Students who are repeating the subject will not be treated differently.

COPIES AND PLAGIARISMS

In the event of a student committing any irregularity that may lead to a significant variation in the grade awarded to an assessment activity, the student will be given a zero for this activity, regardless of any disciplinary process that may take place. In the event of several irregularities in assessment activities of the same subject, the student will be given a zero as the final grade for this subject. Those evaluation activities in which there have been irregularities cannot be reassessed.

AI USE

In this subject, the use of Artificial Intelligence (AI) technologies is not allowed in any of its phases. Any work that includes fragments generated with AI will be considered a lack of academic honesty and may lead to a partial or total penalty in the grade of the activity, or greater sanctions in serious cases.

Bibliography

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Bosque Sendra, J. García, R.C. (2000), El uso de los sistemas de información geográfica en la planificación territorial. *Anales de Geografía de la Universidad Complutense*, 20: 49-67.

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Longley, P.A. Goodchild, M.F. Maguire, D.J. Rhind, D.W. (2001), Geographical Information Systems and Science. Wiley.

Maguire, D.J., M.F. Goodchild y D.W. Rhind (eds.) (1991) Geographical Information Systems. Principles and Applications. 2 Vol. Longman Scienti Technical. Essex. 649+447 p.

Oyala, V. (2011). Sistemas de Información Geográfica. <https://volaya.github.io/libro-sig/>

Software

Specific software for Geographic Information Systems (GIS): ArcGIS Pro and MiraMon.

Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this [link](#). To consult the language you will need to enter the CODE of the subject.

Name	Group	Language	Semester	Turn
(PLAB) Practical laboratories	1	Catalan	second semester	morning-mixed
(PLAB) Practical laboratories	2	Catalan	second semester	morning-mixed
(PLAB) Practical laboratories	3	Catalan	second semester	morning-mixed
(TE) Theory	1	Catalan	second semester	morning-mixed
(TE) Theory	2	Catalan	second semester	morning-mixed
(TE) Theory	3	Catalan	second semester	morning-mixed