

Geographical Information Systems Applied

Code: 101598
ECTS Credits: 6

Degree	Type	Year	Semester
2501002 Geography and Spatial Planning	OB	3	2

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Use of Languages

Principal working language: catalan (cat)
Some groups entirely in English: No
Some groups entirely in Catalan: Yes
Some groups entirely in Spanish: No

Teachers

Francesc Coll Pujol
Cristina Domingo Marimon

Prerequisites

Having completed a first course in Geographic Information Systems is essential, as well as having basic knowledge of Cartography.

Many of the bibliography of the subject is in the English language, so the student should be able to at least read in that language.

Objectives and Contextualisation

After a first course in Geographic Information Systems (GIS), where solid knowledge based on the conceptual and methodological foundations of the discipline has been achieved and in an important practical skill, this subject constitutes an applied approach in the context of the handling, analysis, representation, etc., of geographic information in a GIS. The subject, however, also aims to broaden the knowledge in the field that is its own, so that the objectives are both theoretical nature, and correspond to a second level in which to consolidate, deepen or expand knowledge, such as of a practical nature, in this case no longer in the form of the small examples of a first course, but as use cases derived from the needs in planning and territorial management, research in geographic information, etc, from physical, regional, and human geographic perspectives.

In the course, it is not intended to train in a specific software. The message is that in the case of a case of use, the student must know (or learn if necessary) the necessary concepts, understand what strategies it is appropriate to apply and know what tools are within their reach. With this in mind, the maturity of the case of use will allow you to find out what features you need in each situation and choose or adapt to the possibilities that you will find at each moment and place of the future development of your activity.

Among the objectives set out in the course are:

- Know how to georeference analog cartographic documents for their incorporation into a GIS and know what are the acceptable quality criteria in this process. This objective will be achieved in several applied cases (different cartographic projections, scales, etc.).
- Expand the knowledge about formats and sources of data of utility for the accomplishment of geographic studies of all type; attention will be paid both to de facto and de jure standards. The theoretical discourse will be dressed with a series of examples from the most conceptual point of view (punctual data of irregular geographic distribution, zonal data, etc. in different formats and origins, with special attention to those provided through the Internet) as thematic (demographic, meteorological, etc.). In this context, the knowledge about the meaning, interest and use of metadata standards, on spatial data infrastructures and on remote sensing will be broadened.
- Reinforce the practice of digitization and vector topology building as one of the basic sources of data incorporation into a GIS. This objective will be achieved in many cases applied (different cartographic projections, scales, etc.) and will be completed with the re-elaboration of the materials in classical operations such as the grouping of polygons by thematic criteria, etc.
- Know the main applications and methods of generation of the most common types of digital terrain models.
- Expand and reinforce the knowledge of basic GIS operations such as mosaic, clipping, changes in spatial resolution and cartographic projection or reference system (ED50 to ETRS89, for example), raster / vector conversions, etc.
- Expand and reinforce the knowledge of GIS analysis tools in the context of the real applications proposed in this course, such as territorial dynamics with remote sensing, both for urban growth and for forest fires, etc.
- Know how to integrate the previous knowledge so that the student is able to take geographic information and, independently, integrate it into a GIS to analyze it. The compilation of regional information on various aspects, human and physical, and its correct structuring and documentation is a summary objective of the course.

Competences

- Analysing and interpreting environmental problems.
- Analysing and interpreting landscapes.
- Mastering the different forms of management and acquisition of geographic information as interpretation tools of territory, and maps and Earth observation imagery in particular.
- 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 develop the necessary learning skills in order to undertake further training with a high degree of autonomy.

Learning Outcomes

1. Analysing and interpreting environmental problems using geographical information systems.
2. Analysing the main dynamics of today's world from a geographical point of view.
3. Comparing landscapes using geographical information systems.
4. Describing the various methods of geographical information retrieval as production and interpretation tools of maps.
5. Producing an individual work that specifies the work plan and timing of activities.
6. Solving problems autonomously.
7. Summarising acquired knowledge about the origin and transformations experienced in its several fields of study.

Content

The various aspects to be developed in the subject are:

1. Formats, standards and data sources
2. Georeferencing of cartographic documents

3. Digitization and advanced topological structuring
4. Basic operations in GIS
5. Generation and use of the Digital Models of Elevations and Space Interpolation
6. GIS analysis operations
7. Application in practical cases

The application in practical cases will be developed throughout the course, in an integrated way in the various subjects covered in the course.

Methodology

The contents of the subject will be developed through the following activities:

- Oral presentations (in-person group) and documentation and reading guides (virtual group) provided by the teacher.
- Reading of chapters of books or articles (individual activity of the students complementary to the classroom work).
- Teacher-guided class practices (in-person group) and practice development guides (virtual group) provided by the teacher.
- Practices carried out autonomously by the students based on proposals from the teachers.

For the accomplishment of the subject GIS specific software will be used.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Teacher-guided class practices / Provided practice development guides	37	1.48	1, 2, 3, 5
Theoretical classes / Material provided and reading guides	7	0.28	2, 4, 7
Type: Supervised			
Personalized attention to the student (appointments, tutorials)	25	1	1, 7
Type: Autonomous			
Class practices done independently by the students	60	2.4	1, 3, 5, 6
Study of theoretical material	15	0.6	4, 7

Assessment

The evaluation activities are:

1 / Theoretical exam (40% of the grade) and practical test with a computer (20% of the grade), done in the middle of the year and at the end of the course. These examinations are on-site for both face-to-face students (Group 1) and virtual (Group 70). The dates of these exams are made public at the beginning of the course, but they are usually at the beginning of April and at the end of May. In order to be able to submit to re-evaluation, it is mandatory to have at least one of the partial exams.

2 / Exercises delivered throughout the subject (40% of the grade). To be eligible for reassessment, it is mandatory to have delivered at least 75% of the assessed exercises. The unpaid assessed exercises will be average with the other exercises, with a score of 0. The assessed exercises cannot be reassessed.

The subject is passed with a 5. The student who has not been presented to either one of the theoretical-practical tests, nor to the test of re-evaluation, nor has given more than 50% assessable exercises. The minimum mark to make a mean between the practical and theoretical parts of the exams is 4. This minimum average of 4 is considering the average between the two partial theoretical examinations and the two partial practical exams respectively. Only the exams will be passed (and therefore only average will be done with the practices) if the average mark of the exam (theoretical and practical, with the corresponding weighting) is 5.

There will be a re-evaluation exam recovery for those people who have been evaluated on a continuous basis, but do not reach the approved one. In order to be able to attend the recovery, 75% of the individual exercises must have been delivered and at least a partial exam. Only the theoretical exam can be recovered, only the practical one or both; and only the first or second part of the course, depending on the part or parts suspended. The note of the examination of recovery will replace the partial notes that fit (theoretical first part, practical first part, theoretician second part and / or practical second part) for the calculation of the final note, although the note of the examination recovered be less than the previous one. The student who is present at recovery can have a final grade greater than 5. The assessable exercises cannot be recovered.

The copying or plagiarism of material, both in the case of works and in the case of examinations, constitute a crime that will be sanctioned with a zero to the activity. In the case of recidivism, the entire subject will be suspended. Let's remember that a "copy" is considered a work that reproduces all or most of the work of one or more partners. "Plagiarism" is the fact of presenting all or part of an author's text as its own, without citing the sources, whether in paper or in digital format. See UAB documentation on "plagiarism" at: http://wuster.uab.es/web_argumenta_obert/unit_20/sot_2_01.html.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
1 Initial half course theory exam	20%	1	0.04	2, 4, 7
2 Initial half course practical test in computer lab	10%	2	0.08	2, 3, 6
3 Second half course theory exam	20%	1	0.04	2, 4, 7
4 Second half course practical test in computer lab	10%	2	0.08	2, 3, 6
5 Assignments delivered along the course	40%	0	0	1, 3, 5, 6

Bibliography

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