Universitat Autònoma de Barcelona

2020/2021

Geographic Information Systems

Code: 104239
ECTS Credits: 6

Degree	Type	Year	Semester
2503710 Geography, Environmental Management and Spatial Planning	OB	1	2

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

Contact

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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

Josep Gili Prat

Prerequisites

In order to follow this subject without any difficulties, it is important to have gained the knowledge of the first semester subjectt Introduction to the cartography.

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

- Combine distinct techniques and methods of representation and spatial analysis in elaborating materials for transmitting results.
- Critically analyse the relationship between society and the region applying the conceptual and theoretical framework of geography.
- Explain and represent territorial processes using statistical techniques, and graphic, cartographic and geographical information representations.
- 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.
- Students must develop the necessary learning skills to undertake further training with a high degree of autonomy.

Learning Outcomes

1. Combine distinct techniques and methods of representation and spatial analysis in elaborating materials for transmitting results.
2. Differentiate between different cartographical information systems.
3. Perceive GIS as an instrument to provide results for specific questions.
4. Process and analyse local and regional data.
5. Recognise the two models of data used to represent reality (vector and raster data models)
6. 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.
7. Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.
8. Students must develop the necessary learning skills to undertake further training with a high degree of autonomy.

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: Georeference

Localisation as a connecting factor

Basic georeference methods

Main reference systems

Block 3: Data models in GIS

Raster model

Vector model

Data sources and publishing on the Internet

Block 4: Introduction to GIS use. Spatial analyst

Cartographic modelling and analysis

Proximity analysis

Methodology

The theoretical knowledge is introduced and reinforced by the teacher in class and also through the students' own individual work when they study the specific materials or with dynamic learning activities set by the teacher of this subject. Students will also need to read a book, book chapter/s or an article (students' individual follow-up activity outside the class).

The technical and instrumental knowledge will be developed through a number of guided practical tasks during the class and other individual practical tasks and/or in small groups that students will need to do on their own. Moreover, a final synthesis practical task of this subject will be created.

In these activities, we will work with the competences that enable students to gain the ability to prevent and solve problems, adapt oneself to unexpected situations and take decisions. They will also need to communicate efficiently, both orally and in writing, their knowledge, results and abilities by using their own IT tools correctly.

All the subject's data and materials will be available on the Virtual Campus through an IT platform used by the teachers (Moodle) that provides a Virtual Learning Environment to support the studies.

It is intended for the students to use specific GIS programs to develop their practical tasks: MiraMon (free) or ArcGis (commercial).

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Master classes with IT support	15	0.6	2, 3, 6, 5
Practical tasks in class guided by the teachers	24	0.96	1, 2, 3, 8, 7, 6,

			5, 4
Type: Supervised			
Individual and collective work tutored by teachers	30	1.2	1, 2, 3, 8, 7, 6, 5, 4
Type: Autonomous			
Creation of practical tasks using specific programs and the recommended bibliography. Self-study	75	3	1, 2, 3, 8, 7, 6, 5, 4

Assessment

The evaluation process is continuous and it includes four evaluation activities distributed throughout the course:

Mid-term theory exams (30%)

Mid-term practical exams (30%)

Practical exercises (40%)

The average between the theory and practical exams is done through a mark of 4 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 tasks. Students cannot take an exam if all the practical tasks have not been delivered.

REEVALUATION

Once the normal evaluation finishes, students will have the possibility to do a reevaluation exam within the dates set by the Faculty. In order to do this retake exam, students need to be evaluated previously in a number of activities. The weight of these activities has to be equivalent to at least two thirds of the total qualification of the subject or module. A minimum qualification in the average of the subject has to be obtained if the student wants to do this retake exam. This qualification can't be more than a 3.5. (These conditions are adapted to the legislation of UAB's evaluation system in the Article 112 ter. Retake http://www.uab.cat/doc/Modificacio_normativa_academica_CG120717).

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 evaluated". 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

When we talk about copies, we refer to the evidence that the project or the exam has been partially or totally created without the intellectual contribution of the author. In this definition, we also include the proven attempt to copy in the exams and delivered projects and the violation of the laws that assure intellectual authorship. Plagiarisms refer to the projects and texts from other authors that someone pretends to be his/her own creation. It is a crime against intellectual property. In order to avoid committing plagiarism, quote all the

sources that you use when writing the report of a project. According to UAB's law, copies and plagiarisms or any other attempt to alter the results of one's own evaluation or someone else's -allowing to copy, for example, implies a result of the corresponding part (theory, problems or practical tasks) of a 0 and in this case, the student will fail the subject. This does not limit the right to take academic and legal actions against those who have participated. See UAB documentation about copies and plagiarisms
http://wuster.uab.es/web_argumenta_obert/unit_20/sot_2_01.html

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Practical exams	30%	3	0.12	2, 3, 5
Practical exercises delivered throughout the course	40%	3	0.12	1, 2, 3, 8, 7, 6, 5, 4
Theory exams	30%	0	0	1, 2, 3, 8, 7, 6, 5, 4

Bibliography

Mandatory

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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.