Universitat Autònoma de Barcelona

2019/2020

Modelling and Analysing Geographical Information

Code: 102829
ECTS Credits: 6

Degree	Type	Year	Semester
2501915 Environmental Sciences	OT	4	0

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

Other comments on languages

The presentations and explanations of the theory part are in English.

Teachers

Joan Cristian Padró García

Prerequisites

A minimum English level is needed, reading and listening. Most of Bibliography and the Theory part are in English.

The previous matter "Cartografia i Fotointerpretació" (Cartography and Fotointerpretation) is recommended, but not needed.

Objectives and Contextualisation

The purpose of teaching Geographic Information Systems (GIS) is to achieve solid knowledge based on the methodological foundations. This subject is an introduction to the domain of GIS and the general level of geographic information. It is not intended to train in a specific software. The aim is the understanding of fundamental aspects related to how to handle and analyze the data located on the territory. At the end of this course, it is necessary to know how to apply the skills achieved, through the consolidation of both theoretical and practical aspects developed, to the application needs raised from other subjects. This implies not only how to use GIS, but also understand what is done when using them and why they are used.

With this aim, a dual purpose is considered associated with the theoretical-practical content of the subject. On the one hand, the conceptual context that revolves around the GIS, and, on the other, the set of skills that require the use of GIS. On a global approach, it is intended that you know and understand what the GIS is, how they work and when they are to be used.

At the conceptual level the following objectives are formulated:

- Understanding the nature of geographic information systems (definition and characteristics)

- Knoweldge and understanding the two data structures used to model reality (vector and raster data structures)
- Knowelde and understanding about how to introduce, structure and store geographical information
- Knoweldge and understanding the main functionalities of GIS handling and analysis carried out to solve different questions
- Knoweldge about the main sources of data from GIS
- Knoweldge and skills on the main GIS applications

In the second case, the acquisition of skills for being able to use a GIS, is not intended to show technique for the technique, but to raise awareness of what can be done, how to do it and what to apply it. The objectives we can specify them in the following way:

- Understanding and knowledge about how to take advantage of information systems as an instrument to obtain answers to certain types of questions
- Knowledge about what types of operations are appropriate in each case to solve certain needs
- Acquisition of practical expertise in the resolution of characteristic problems of this discipline

From the objectives defined above, it is intended that there is a continuous interaction between theory and practice.

Competences

- Adequately convey information verbally, written and graphic, including the use of new communication and information technologies.
- Analyze and use information critically.
- Demonstrate adequate knowledge and use the tools and concepts of the most relevant social science environment.
- Demonstrate concern for quality and praxis.
- Demonstrate initiative and adapt to new situations and problems.
- Quickly apply the knowledge and skills in the various fields involved in environmental issues, providing innovative proposals.
- Teaming developing personal values regarding social skills and teamwork.
- Work autonomously

Learning Outcomes

1. Adequately convey information verbally, written and graphic, including the use of new communication and information technologies.
2. Analyze and interpret environmental problems for territorial planning.
3. Analyze and interpret environmental problems using geographic information systems.
4. Analyze and use information critically.
5. Demonstrate concern for quality and praxis.
6. Demonstrate initiative and adapt to new situations and problems.
7. Identify geographic processes in the environmental surroundings and to value properly and originally.
8. Know and apply the most relevant methodologies in the planning.
9. Know the main territorial and landscape dynamics in Catalonia and Spain.
10. Teaming developing personal values regarding social skills and teamwork.
11. The main features of the so called global change.
12. Work autonomously

Content

Block 1: The geographical information

- Unit 1: Information about the territory and located phenomena in the territory
- Unit 2: Geographic and non-geographic entities
- Unit 3: The value of geographic information

Block 2: Georeferencing

- Unit 1: Localization as a factor of relationship
- Unit 2: The basic methods on georeferencing
- Unit 3: Main reference systems

Block 3: GIS data models

- Unit 1: The map as a model of the real world
- Unit 2: The raster model
- Unit 3: The vector model

Block 4: The use of GIS. Spatial analysis

- Unit 1: Geoprocessing
- Unit 2: Spatial analysis
- Unit 3: Introduction to Remote Sensing

Methodology

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

- Oral expositions by the teachers.
- Reading of selected parts of the bibliography.
- Synthesis of readings performed.
- Practices of class guided by the teachers.
- Sequence of individual class practices and / or in small groups.

The practical activity in this subject is built around the realization of exercises those develop specific aspects of the course topics.

The practices are carried out using the specific GIS software: MiraMon, ArcGis and other complementary programs such as Access, Excel / Open Office Calc, etc.

The exercises and practices are interleaved in the development of the subject, and they will be performed in many cases within the ownclass schedule. Another part of the exercises, either partially or entirety, will be completed by the students.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Practical exercices	30	1.2	3, 2, 4, 12
Theoretical classes	22	0.88	8, 11, 9, 7
Type: Autonomous			
Practices carried out autonomously	88	3.52	4, 6, 5, 1, 12, 10
Reading theoretical material	6	0.24	8, 11, 9, 7

Assessment

The assessment of knowledge and skills in the subject is based on the qualifications obtained in the delivery of internships (individual), as well as the completion of two exams (with a theoretical part and a practical part).

- Theoretical exams (in preson) : 30% of the qualification.
- Practical exams ((in preson): 30% of the qualification.
- Individual exercises delivered: 40% of the qualification. Delivery in the virtual campus (report and cartographic bases, layers), with a fixed deadline.

It is mandatory to deliver at least two of the indvidual deliberd exercises in order to calculate an average qualification (attention to those that are not delivered, they contribute with a 0 to the average).
To ask for a reevaluation, the student must have been received a mark in activities that represent at least 2/3 of the global mark during the course. In the present matter, it means that the student must have been previously evaluated in one of the two exams (30%) and in the total of the individual exercises deliverables (40%). Only exams are recoverable, practical exercises are not recoverable.
The approved is obtained with a global 5 and a minimum grade of 4 for each exam is mandatory.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Deliverables exercices	40 %	0	0	3, 4, 8, 6, 5, 7, 1, 12, 10
Practical exam	30%: first exam (15%) and second exam (15%)	1	0.04	3, 4, 8, 5, 1, 12
Theoretical exam	30%: first exam (15%) and second exam (15%)	3	0.12	3, 2, 4, 8, 11, 9, 5, 1, 12, 10

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