Universitat Autònoma de Barcelona

2022/2023

Geographical Information Systems, Planning and Landscape

Code: 44470
ECTS Credits: 6

Degree	Type	Year	Semester
4317520 Territorial Studies and Planning	OT	0	2

Contact

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Use of Languages

Principal working language: catalan (cat)

Other comments on languages

Given the internationalization of the master's degree, the language of communication in the classroom will be Catalan and/or Spanish depending on the majority language of the students

External teachers

Joan-Cristian Padró Garcia

Prerequisites

This module is an introduction to Geographic Information Systems (GIS), learning basic concepts, as well as basic skills in the most commonly used GIS software in the professional field (ArcGIS, QGIS and MiraMon). That is why before starting the practical sessions it is essential that those students who have not taken any GIS subject or know the MiraMon, ArcGis or QGIS programs, take the subject. The essential basic notions in GIS will be obtained, both from a conceptual and instrumental point of view.

Objectives and Contextualisation

The need to use GIS as support for urban planning tasks and the analysis of the territory is indisputable. Their ability to easily interrelate the spatial and thematic components make them an essential tool for all planning tasks that aim to establish a principle of rationality and territorial balance. Therefore, it is a cross-sectional analysis tool to the rest of the modules of this master's degree, which at the same time allows the territorial dynamics to be easily incorporated into the analysis from the comparison of different moments. A key aspect when facing urban and territorial planning. With GIS we make a first visual inspection of the territory through different cartographic sources and at different scales to answer the question, where are the different geographic objects located?; but also, from the spatial analysis, we must dare to propose where they should be located. These proposals do not only start from an instrumental knowledge of the cartographic technique but must be fed with the theoretical and practical knowledge of land use planning and the instruments of urban analysis, which must allow us to establish more rational management and planning criteria. Therefore, following the theoretical principles on which the study of land uses is based, practical work will be done with the GIS that will consist of analyzing at different scales and in different areas. By doing so, the objective is to provide the planning with the empirical analysis provided by the GIS tools. This module is designed so that the

student can, on the one hand, become familiar with the concepts that allow understanding the fundamentals of GIS for urban analysis and land uses, and on the other, achieve the instrumental skills necessary to know use GIS in territorial planning tasks.

The specific objectives of this module are:

A) Achieve solid knowledge based on the conceptual and methodological foundations of GIS applied to territorial planning. It is not intended to train in a specific GIS software, but ratherto learn and master the tool from the need posed by the elaboration of the different basic maps for the creation of final maps.

B) Know (or learn if necessary) the necessary concepts and understand what strategies should be applied. Know what tools you have at your disposal to find the functionalities you need from the program in each case and know how to choose or adapt to the possibilities that you will find to solve management and planning problems of the territory.

C) Design and formulate proposals in the management of urban analysis that consider territorial planning.

Competences

- Analyse and interpret spatial and regional projections of social and economic imbalances in the processes of land-use planning and urban planning
- Apply multiple methodologies of geographical analysis at different local and regional.scales
- Promote the use and development of the principles of ecological, social and economic sustainability through mechanisms of citizen participation.
- That the students can apply their knowledge and their ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study.
- Use geographical information technologies in map projection and representation for the design of useful scenarios in land-use planning and management and in urban planning

Learning Outcomes

1. Apply the results of spatial analysis in specific cases related to environmental and territorial planning and risk analysis.
2. Carry out mapping and analysis on the basis of urban and regional imbalances.
3. Generate models and scenarios for different problems related to environmental planning using the environmental cartography generated.
4. Identify regional and urban changes on different scales (micro, meso, macro) as a central point for geographical research.
5. Manage GIS applied to the modern geographical landscape.
6. Master the cartographic expression of territorial planning information.
7. That the students can apply their knowledge and their ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study.
8. Understand advanced methodology of regional analysis and urban planning.
9. Use GIS from a conceptual point of view and in their application to solve problems of planning and management.
10. Use GIS to interpret socioeconomic situations in the areas of study in the processes of urban planning.
11. Use cartography of variables related to the regional and urban management and planning using GIS.
12. Use key concepts for producing landscape catalogues, charts and impact and integration studies, with special attention to the processes of public participation.

Content

GIS data sources and tools for mapping.

Map composition.

Main tools for spatial representation of socioeconomic and environmental variables.

Use of spatial analysis tools.

Graphic representation of territorial and urban changes.

Elaboration of maps at neighborhood level and / or census sections.

Digitization of new layers.

Methodology

Teaching is organized through theoretical and practical classes. The practices will be supported by specific GIS and remote sensing software: ArcGis, QGIS or MiraMon.

Activities that cannot be done in person will be adapted to the possibilities offered by the UAB's virtual tools. The exercises, projects and theoretical classes will be carried out through virtual tools, such as tutorials, videos, Teams sessions, etc. The teacher will ensure that the student can access or offer alternative means, which are within their reach.

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.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Practical classes	22.5	0.9	1, 8, 6, 12, 3
Theoretical classes	7.5	0.3	8, 12, 4
Type: Supervised			
Field trip	5	0.2	2, 8, 6, 11, 10, 7
Workshops	20	0.8	1, 2, 8, 6, 11, 12, 3, 4, 10, 5, 7, 9
Type: Autonomous			
Carry out practices	20	0.8	8, 11, 12, 3, 5, 7, 9
Core work development	54	2.16	1, 2, 8, 6, 11, 12, 3, 4, 10, 5, 7, 9
Self study	10	0.4	

Assessment

The evaluation of the module will be done according to the following concepts:

- Individual and group practices: 20% of the evaluation.

- Written test: 15% of the evaluation.

- Core work and maps of the final memory: 50% of the evaluation

- Oral presentation of the core work and maps of the final memory: 15% of the evaluation

Core work is not subject to re-evaluation

VERY IMPORTANT: Total or partial plagiary of any of the exercises will automatically be considered "fail" (0) for the plagiarized item. Plagiary is copying one or more sentences from unidentified sources, presenting it as original work (THIS INCLUDES COPYING PHRASES OR FRAGMENTS FROM THE INTERNET AND ADDING THEM WITHOUT MODIFICATION TO A TEXT WHICH IS PRESENTED AS ORIGINAL). Plagiarism is a serious offense. Students must learn to respect the intellectual property of others, identifying any source they may use, and take responsibility for the originality and authenticity of the texts they produce.

In the event that assessment activities cannot be taken onsite, they will be adapted to an online format made available through the UAB's virtual tools (original weighting will be maintained). Homework, activities and class participation will be carried out through forums, wikis and/or discussion on Teams, etc. Lecturers will ensure that students are able to access these virtual tools, or will offer them feasible alternatives.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Individual practices	20%	7	0.28	1, 2, 8, 6, 11, 3, 10, 5
Presentation of core work (Work: 50%, Oral presentation: 15%)	65%	1	0.04	1, 2, 8, 6, 11, 12, 3, 4, 10, 5, 7, 9
Written test	15%	3	0.12	6, 12, 3, 10

Bibliography

Bolstad, Paul (2016) GIS Fundamentals. Available in: http://www.paulbolstad.net/gisbook.html

Bonham-Carter, Graeme F. (1994) Geographic information systems for geoscientists modelling with GIS, Pergamon. Kidlington. 398 p.

Burrought, Peter A. & McDonnel, Richard A. (1998) Principles of Geographical Information Systems (2ondEdition). Oxford University Press.

Laurini, Robert & Tompson, Derek (1992) Fundamentals of Spatial Information Systems Academic Press. Londres. 680 p.

Longley, Paul A. Goodchild, Michael F. Maguire, David J. & Rhind, David W. (2005) Geographical InformationSystems and Science. John Wiley & Sons.

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

Oyala, Víctor (2011) Sistemas de Información Geográfica (https://github.com/volaya/libro-sig/releases/).

Santos Preciado, José Miguel (2004) "Sistemas de información geográfica. Unidad didáctica".(60105UD01A01) UNED. Madrid. 460 p. ISBN: 84-362-2006-4.

Webography:

MiraMon reference manual: https://www.miramon.cat/help/spa/mm32/manualrf.htm

QGIS training manual: https://docs.qgis.org/2.14/es/docs/training_manual/

QGIS user guide: https://docs.qgis.org/2.14/es/docs/user_manual/index.html

ArcMap training manual:
https://desktop.arcgis.com/es/arcmap/latest/get-started/introduction/arcgis-tutorials.htm

Oyala, Víctor(2011) Sistemas de Información Geográfica (https://github.com/volaya/libro-sig/releases/).

Joan-Cristian Padró youtube channel (Tutorials SIG català):
https://www.youtube.com/playlist?list=PL-jTd-6Ai5J_fu8u4m_1EZDhNJXZ0lxqi

Software

SOFTWARE:

Text editing software, spreadsheets, and presentations:

Office package (Word, Excel and PowerPoint) or LibreOffice

Notepad or Notepad ++

GIS specific software:

MiraMon, ArcGIS and/or QGIS

The evaluable exercises and works will be presented in such a way that any of the three indicated GIS software can be used.