

**Geographical Information Systems, Planning and Landscape**

Code: 42515  
ECTS Credits: 6

Degree	Type	Year	Semester
4313300 Regional and Population Studies	OT	0	1

## Contact

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## Teachers

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## Use of Languages

Principal working language: catalan (cat)

## Prerequisites

This module is not an introduction to the GIS, but a series of fundamental concepts, as well as basic abilities in ArcGis are given. That is why before beginning the practical sessions it is essential that those students who have not done any GIS subject matter or know the ArcGis program, read the recommended chapters of the proposed GIS online book (in the bibliography). Thus, the basic notions essential to follow the subject will be obtained, both from a conceptual point of view as well as an instrumental one.

## Objectives and Contextualisation

The need for the use of GIS as a support for urban planning tasks and the analysis of the territory is indisputable. Its ability to interrelate with ease the space component and the thematic one, make them an essential tool for all those planning tasks whose objective is to establish a principle of rationality and territorial balance. And therefore, it is a transversal analysis tool in the other modules of this master's degree, which in turn allows the territorial dynamics in the analysis to be easily incorporated through the comparison of different moments. A key aspect when tackling urban and territorial planning.

With the 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 have to dare to propose where they should be located. These proposals are based not only on an instrumental knowledge of cartographic techniques but also on theoretical and practical knowledge of territorial planning and urban analysis tools, which should allow us to establish a more rational management and planning criteria. Therefore, following the theoretical principles on which the study of land uses is based, a practical work will be done with the GIS which will consist of analyzing them at different scales and in different areas. In doing so, the goal is to provide the planning with the empirical analysis given by GIS tools.

This module is designed so that the student is able to, on the one hand, familiarize himself with the concepts that allow to understand the foundations of the GIS for urban analysis and land uses, and on the other, to achieve the instrumental abilities needed to know how to 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 students in a specific GIS software, but to learn and master the tool based on the need for the development of the different basic maps for the creation of final maps.

b) Know (or learn if necessary) the necessary concepts and understand which strategies it is appropriate to apply. Knowing which tools are available to look for the functions that the program needs in each case and know how to choose or adapt to the possibilities that will be found in order to solve problems of management and planning of the territory.

c) Design and make proposals in the management of urban analysis that take into account territorial planning.

## Competences

- Analyze and interpret the interrelationship between population dynamics and historical and recent territorial transformations
- Apply critical concepts and advanced theoretical approaches to the study of land use and population
- Apply the different methodologies of geographic and demographic analysis at different territorial levels and population sizes
- Design projects of urban and regional planning using figures and methodologies appropriate territorial scales
- Detect the complexity of territorial and demographic dynamics and recognize the most efficient management mechanisms, particularly in conflict situations
- Integrate knowledge and use it to make judgements in complex situations, with incomplete information, while keeping in mind social and ethical responsibilities.
- Promote the implementation and advancement of the principles of ecological, social and economic sustainability.
- Solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to the field of study.
- Use acquired knowledge as a basis for originality in the application of ideas, often in a research context.
- Using the techniques of projection and mapping for the design of future scenes.

## Learning Outcomes

1. Analyze and interpret the demographic, urban, environmental and landscape problems arising from the processes of contemporary territorial transformations.
2. Apply the results from the spatial analysis in specific cases related to environmental planning, land and risk assessment.
3. Define the main sources of errors and their propagation models on elaborate models.
4. Design tools for environmental education in relation to the integrated understanding of the landscape.
5. Employing participatory processes (web, discussion groups and public presentation) in relation to the landscape catalogs.
6. Evaluate the environmental consequences of natural processes and human activity.
7. GIS applied to handle modern geographical landscape.
8. Generating models and scenarios for various problems related to environmental planning through environmental mapping generated.
9. Integrate knowledge and use it to make judgements in complex situations, with incomplete information, while keeping in mind social and ethical responsibilities.
10. Interpret the evolution of the landscape in relation to territorial dynamics.
11. Knowing the different methodologies of analysis scale, applying knowledge in case studies.
12. Mastering the expression of the territorial cartographic information.
13. Promote management models based on environmental education, participation and environmental certification.
14. Promote the implementation and advancement of the principles of ecological, social and economic sustainability.

15. Solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to the field of study.
16. Understand the current concept of landscape in spatial planning.
17. Use GIS from both conceptually and in its application to solving problems of environmental and territorial planning.
18. Use acquired knowledge as a basis for originality in the application of ideas, often in a research context.
19. Use mapping variables related to environmental management and planning through GIS.
20. Use the keys to developing the landscape catalogs concepts, letters of landscape and impact studies and landscape integration.

## Content

- Sources of data and GIS tools for the elaboration of maps.
- Main tools for spatial analysis: elaboration of MDE and derivatives.
- Cartographic generalizations and modeling.
- Advanced use of spatial analysis tools.
- Graphic representation of territorial and urban changes.
- Elaboration of neighborhood scale maps and / or census sections.

## Methodology

Teaching is organized through theoretical and practical classes. The practices will be based on specific GIS and remote sensing software: MiraMon and ArcGis.

## Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Practical classes	22.5	0.9	2, 11, 9, 18, 17
Theoretical classes	7.5	0.3	16, 14, 18
Type: Supervised			
Field trip	5	0.2	1, 2, 11, 5, 10, 9, 18
Workshops	20	0.8	1, 2, 6, 11, 3, 4, 12, 19, 5, 8, 10, 13, 9, 18, 17
Type: Autonomous			
Carry out practices	20	0.8	1, 2, 11, 5, 10, 13, 9, 18, 17
Core work development	54	2.16	1, 2, 6, 16, 11, 3, 4, 12, 19, 20, 5, 8, 10, 14, 13, 9, 15, 18, 7, 17
Self study	10	0.4	

## Assessment

The evaluation of the module will be based on the following concepts:

- Individual and group practices: 20% of the evaluation.
  - Written test: 15% of the evaluation.
  - Core work and maps of the final report: 50% of the evaluation
  - Oral presentation of the core work and maps of the final report: 15% of the evaluation
- Core work is not subject to re-evaluation

VERY IMPORTANT: Total or partial plagiarism of any of the exercises will automatically be considered "fail" (0) for the plagiarized item. Plagiarism 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.

## Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Individual practices	20%	7	0.28	2, 16, 11, 3, 12, 19, 20, 8, 9, 18, 17
Presentation of core work (Work: 50%, Oral presentation: 15%)	65%	1	0.04	1, 2, 6, 16, 11, 3, 4, 12, 19, 20, 5, 8, 10, 14, 13, 9, 15, 18, 7, 17
Written test	15%	3	0.12	9, 15, 18

## Bibliography

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

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

Burroughs, P.A. McDonnell, R.A. (1998), Principles of Geographical Information Systems (2nd Edition). Oxford University Press.

Laurini, R. y Tompson, D. (1992) Fundamentals of Spatial Information Systems Academic Press. Londres. 680 p.

Longley, P.A. Goodchild, M.F. Maguire, D.J. Rhind, D.W. (2005), Geographical Information Systems and Science. John Wiley & Sons.

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

Oyala, V. (2011). Sistemas de Información Geográfica (enllaç).

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