Universidad Zaragoza

Academic Year: 2025/26

66718 - Techniques for spatial data analysis

Teaching Plan Information

Academic year: 2025/26
Subject: 66718 - Techniques for spatial data analysis
Faculty / School: 103 - Facultad de Filosofía y Letras
Degree: 669 -
Ambit: History, archeology, geography, philosophy and humanities
Tipo de enseñanza: Presencial
ECTS: 9.0
Year: 1
Semester: Annual
Subject type: Compulsory
Module:
Ámbito de conocimiento de asignatura: History, archeology, geography, philosophy and humanities

1. General information

The course "Techniques for spatial data analysis" prepares students to use the tools and Geographic Information Technologies necessary for addressing territorial and environmental planning, management, and planning processes. Specifically, the course focuses on Geographic Information Systems, Remote Sensing, and Thematic Cartography, and is therefore eminently applied in nature. The theoretical sessions present the basic concepts of the subject and address searching and consulting geographic and cartographic information servers. The practical sessions focus on case studies whose solutions require the application of various methodologies and tools. Furthermore, project-based learning is considered an essential activity for achieving several of the core competencies. This course complements the subjects in Subject 1 of the Master's degree from a more applied perspective.
The course is part of the course "Tools for Territorial and Environmental Planning" and the block of compulsory subjects.
This course is identified as a checkpoint for assessing the transversal competencies "Critical Thinking" and "Lifelong Self-Learning." Students who successfully acquire a cross-curricular skill in a subject designated as a "Checkpoint" will receive official certification for that skill.

2. Learning results

To pass this course, students must demonstrate that they have acquired or improved the following skills:
CO_03: Recognize and adapt the administrative and territorial management levels to the working scales and information sources of Geographic Information Technologies.

CO_05: Recognize and evaluate territorial changes at different temporal and spatial scales and their consequences on natural systems, society, the landscape, and management strategies.
CO_06: Interpret the processes and define the environmental, demographic, social, economic, and cultural structures that affect and shape the territory through the use of Geographic Information Technologies.
CO_09: Employ advanced techniques for the development of cartography applied to the resolution of environmental and territorial problems.
CO_10: Develop knowledge, criteria, and methodologies in different areas of balanced territorial development planning and sustainable land use management.
CO_12: Apply procedures and regulations that affect the territory and the environment when using Geographic Information Technologies.
HA_04: Correctly manage the geographic information necessary for the creation of cartography on environmental and territorial issues.

HA_05: Effectively manage Geographic Information Technologies (automatic cartography, Geographic Information Systems, remote sensing) adapting to the scale of work and the subject of study.
HA_06: Appropriately prepare reports that integrate cartography with diagnosis and proposed solutions to specific environmental and territorial problems.
HA_08: Evaluate and make decisions using Geographic Information Technologies to help mediate between different stakeholders and resolve territorial and environmental conflicts.
HA_09: Prioritize measures and actions for territorial and environmental reconfiguration and intervention through the use of Geographic Information Technologies.
HA_10: Advise on the analysis and decision-making regarding territorial and environmental actions of Public Administrations through the use of Geographic Information Technologies.
CP_03: Demonstrate a critical attitude toward the multiplicity of points of view and disciplines involved in a given event, concept, or information.
CP_03: Be able to change the way of thinking, knowing how to measure the validity of the one used and judging its level of adequacy.
CP_06: Be efficient in selecting multidisciplinary learning resources that enable job improvement or personal development.

3. Syllabus

• Geographic Information Systems: In-depth study of spatial analysis and advanced geoprocessing in raster and vector data models for solving territorial and environmental problems, and basic applied spatial statistics.

• Fundamentals of Remote Sensing: Advances in spatial remote sensing tools that enable analysis oriented toward territorial and environmental planning and management (nature and remote sensing systems, visualization and application of pretreatments, enhancements, transformations, and classification processes, integration into GIS, etc.).
• Thematic Cartography: Mastery of the methods and techniques necessary for the development of thematic cartography using Geographic Information Systems.

4. Academic activities

The following activities are planned to achieve the learning outcomes:
• Lectures: interactive sessions for presentation, analysis, and discussion of the various program topics.
• Computerized practicals: use of computer equipment and specific software.
• Personal study.
• Assessment tests.

5. Assessment system

FIRST CALL

a) Continuous assessment system
• Test 1: Cartography applied to the resolution of a territorial and/or environmental problem. The cartography will be completed individually or in a group and presented digitally. Weighting: 70% of the grade. The assessment criteria will be: a) correct application of the proposed methodologies that combine tools in Geographic Information Systems, Remote Sensing, and Thematic Cartography; b) in relation to cartographic design, the inclusion and correction of all the elements that must accompany a map and the appropriateness of the choice of symbols, grids, and/or colors; c) the final cartographic composition (maps, photographs, etc. that help locate or complement the main map, and the correct distribution of all cartographic elements) will also be assessed.

• Test 2: Activity Report. This report, completed individually or in a group, will present the problem posed, the methodology used to create the cartography, the diagnosis derived from the analysis of said cartography, and a proposal for land uses consistent with the results obtained. The report must be submitted digitally. Weighting: 30% of the grade. Assessment criteria: ability to summarize, clarity of writing, precision in handling the concepts specific to the subject, correctness and timeliness of the proposals presented.

b) Global assessment system
• The tests, assessment criteria, and grading weighting are the same as those expressed in the continuous assessment system for the regular session.

SECOND CALL

a) Global assessment system
The tests, assessment criteria, and weighting for the final grade are the same as those expressed in the continuous assessment system for the regular exam.

NOTE: A minimum grade of 5.0 points must be obtained on each test for averaging purposes.

The assessment of the Transversal Competencies "Critical Thinking" and "Lifelong Self-Learning" will be carried out through a voluntary test defined by the faculty at the beginning of the course. The test grade is not linked to the course grade, but rather serves to assess the degree of development of the competencies, which will be certified if the "satisfactory development" level is reached.
For more information, please consult the University of Zaragoza's assessment regulations:
https://zaguan.unizar.es/record/30538
Information about the University of Zaragoza's 5+1 seal can be found on the website:
https://competenciastransversales.unizar.es/

6. Sustainable Development Goals

8 - Decent Work and Economic Growth
13 - Climate Action
15 - Life on land