

25213 - Cartography and geographical information systems

Información del Plan Docente

Academic Year	2016/17
Academic center	201 - Escuela Politécnica Superior
Degree	277 - Degree in Environmental Sciences
ECTS	6.0
Course	2
Period	First Four-month period
Subject Type	Compulsory
Module	---

1.Basic info

1.1.Recommendations to take this course

1.2.Activities and key dates for the course

2.Initiation

2.1.Learning outcomes that define the subject

2.2.Introduction

3.Context and competences

3.1.Goals

3.2.Context and meaning of the subject in the degree

3.3.Competences

3.4.Importance of learning outcomes

4.Evaluation

5.Activities and resources

5.1.General methodological presentation

The learning process that is designed for this subject is based on the following:

The development of presence and non- presence activities.

Classroom activities are those involving teachers and students in person and can develop in different areas of the center

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(theory classroom, computer classroom, drawing classroom, teacher's office) or outside the school (field work).

Among the sessions developed in the classroom theory, participatory activities will consist of lectures and resolution of cases and problems. In these sessions students will raise some assignments or exercises to be solved as academically supervised activities.

The practice sessions will take place mainly in the computer room and classroom drawing. They students will perform various mapping exercises that require the use of different tools (software GPS, cartographic design and geographic information systems) and specific cartographic material (stereoscopes, aerial photographs, maps, etc.).

Fieldwork will learn management targeting techniques and spatial location: GPS, compass and topographic map.

Tutorials (in this case referred to in programming and attendance, different character of the optional tutorials to which every student is entitled) aim to track orders that students must solve. The tutorials are developed in the teacher's office.

Finally, another classroom activity is examination to be held in the usual classroom and in the computer room.

Non presence activities consist basically reading and understanding the "Studio" as well as conducting a series of commissions (cases, problems, mapping, etc.) directed academically. These activities will be conducted with full freedom time.

5.2.Learning activities

The program that the student is offered to help you achieve the expected results includes the following activities ...

MODULE 1. FRAMEWORK OF THE MAPPING

At the end of the module the student should be able to identify the basic elements that make up a map and differentiate between basic, applied and thematic maps. To achieve this objective, they are presented in the classroom numerous examples of cartography, both through PowerPoint presentations, access to servers digital mapping and cartographic collection in a varied role. You must also know the most significant milestones in the history of cartography. To track this part of the course the student will have a dossier on this subject. Finally, the student must also be able to find the necessary cartographic sources to address an environmental nature. The student, individually, perform a map search for a particular municipality and prepare a brief report that will deliver the teacher and will be part of the evaluation activities.

MODULE 2. RATIONALE GEODESIA

Upon completion of the module the student should be able to understand how Earth and the problem of its representation.

MODULE 3. TOPOGRAPHIC MAPPING

At the end of the module the student should be able to read a topographic map and understand the full legend of this. The student will perform a reading of a topographic map. You must also know and skillfully use the UTM projection. The student will make a location of UTM coordinates, and distances, and change Huso

MODULE 4. PHOTOINTERPRETATION

Upon completion of this module the student should know the basic aerial photographic series of our country, its main features and where to find them. To achieve this objective, in theory sessions series of photographs currently available, using in some cases viewers websites of major government agencies will be presented. You must also be able to perform photo interpretation of environmental variables different character: geology, topography, vegetation and land use. PowerPoint presentations by significant examples of how different elements photo interpretation of these variables will be presented. Finally, in the practical sessions, students fotointerpretation aerial photographs and orthophotos, some of which use in the course of Ecology II.

5. MODULE DESIGN AND MAPPING MAPPING THEME

The main objective of this module is that the student is able to make maps. To do this, you must know and be able to

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undertake the various stages that make up the mapping process. You must also know the visual variables that are used to capture the information, and apply some of the methodologies mapping to a specific example. Finally, you must acquire some basic notions of cartographic design and be able to lay out a map. To achieve these objectives, in the theoretical sessions, through lectures supported by PowerPoint presentations basic conceptual notions, which will complement the consultation and comment of examples of different thematic maps will be presented. In the practical sessions, students will design and implement a legend in mapping made from photo interpretation.

MODULE 6. FUNDAMENTALS OF GEOGRAPHIC INFORMATION SYSTEMS

At the end of this module the student should know and understand the basics of Geographic Information Systems (elements that comprise them, models and data structures, methods for incorporating information management and data visualization, query information, analysis space, etc.), as well as some of the most important applications related to environmental sciences. To achieve this objective, in theory sessions will present the conceptual foundations, and several examples of application of this tool facing the environmental analysis will be presented. In addition, the student must also be able to perform some basic operations such as queries, add data to the system (via data files, or by scanning), basic analysis of information, create derivative maps or applied, etc. In the practical sessions, several exercises involving the use of a GIS program will be addressed.

MODULE 7. SPATIAL REFERENCING

At the end of the module the student should be able to use a satellite navigation system for data collection and navigation territory. The student groups will perform a power data with GPS navigation to a point.

MODULE 8. INTRODUCTION TO REMOTE SENSING

This module is intended as a brief reference to Remote Sensing since then, students can deepen this technique, as in Geographic Information Systems in a specific subject. The goal is that students know the basic theoretical fundamentals of this tool, and that values its usefulness in relation to environmental studies. To do so, in theory sessions will be presented both theoretical content, as some significant examples of their application; and in the practical sessions, students displayed satellite images and perform some basic operation interpretation thereof.

5.3.Program

SUBJECT OUTLINE

Introduction and Methodology.

MODULE 1. CONCEPTUAL FRAMEWORK OF CARTOGRAPHY

1. General concepts: introduction to cartographic documents.
2. Cartographic sources for environmental studies.

MODULE 2. FUNDAMENTALS OF GEODESY

1. The Geoide.
2. The Elipsoide of Revolution

MODULE 3. TOPOGRAPHIC CARTOGRAPHY

1. Systems of projection.
2. UTM Projection.
3. Topographic map reading.

MODULE 4. SPATIAL REFERENCING

1. Satellite navigation systems.
2. Recording data.
3. Navigation and spatial point search.

MODULE 5. PHOTOINTERPRETATION

1. Existing aerial coverage in Spain: characteristics and utility for the environmental analysis of territory.

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2. Interpreting aerial photography: lithology, relief, vegetation and uses of soil.

MODULE 6. CARTOGRAPHIC DESIGN AND CARTOGRAPHY THEMES

1. Cartographic design: fundamental concepts of cartographic design, visual variables, colour, map composition.
2. Thematic cartographic: definition and components of thematic maps, processing information, cartographic representation of the information.

MODULE 7. FUNDAMENTALS OF GEOGRAPHIC INFORMATION SYSTEMS

1. Definition and application of Geographic Information Systems for environmental studies.
2. Models and structures of data.
3. Collection, organization and maintenance of information.
4. Data visualization.
5. Functions of spatial analysis.

MODULE 8. INTRODUCTION TO REMOTE SENSING

1. Basic concepts and applications of Remote Sensing in Environmental Sciences.

5.4.Planning and scheduling

For further details concerning the timetable, classroom and other information of the course please refer to the: *Escuela Politécnica Superior de Huesca* web site (<http://eps.unizar.es/academico/horarios-ccaa>).

5.5.Bibliography and recommended resources

BASIC BIBLIOGRAPHY

° ROBINSON, A.H., SALE, R. y MORRINSON, J. (1987), *Elementos de Cartografía*, Omega, Barcelona, 543 pp.

° MORENO JIMÉNEZ, A. (2007), *Sistemas de Información Geográfica. Manual de autoaprendizaje con ArcGIS*, E. Ra-Ma, Madrid, 911 pp.

COMPLEMENTARY BIBLIOGRAPHY

° SLOCUM, T. McMASTER, R.B., KESSLER, F.C., HOWARD, H.H., (2008), *Thematic Cartography and Geographic Visualization*, Prentice Hall, 576 pp.

° BERNHARDSEN, Tor (2002), *Geographic information systems: an introduction*; John Wiley & Son, New York, 428 pp.