SUBJECT TEACHING GUIDE

697 - Geographic Information Systems

Master's Degree in Environmental Engineering and Management

Academic year 2023-2024

1. IDENTIFYING DATA					
Degree	Master's Degree in Environmental Engineering and Management			Type and Year	Optional. Year 2
Faculty	School of civil Engineering				
Discipline	INTEGRATED ENVIRONMENTAL ANALYSIS AND MANAGEMENT				
Course unit title and code	697 - Geographic Information Systems				
Number of ECTS credits allocated	3	Term		Semester based (1)	
Web					
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. INGENIERIA GEOGRAFICA Y TECNICAS DE EXPRESION GRAFICA
Name of lecturer	JAVIER MARIA SANCHEZ ESPESO
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Office	E.T.S. de Ingenieros de Caminos, Canales y Puertos. Planta: + 2. DESPACHO PROFESOR (2037)
Other lecturers	

3.1 LEARNING OUTCOMES
- Terminology and basic concepts about Geographic information systems.
- Know and apply spatial analysis methods and techniques to solve environmental management problems.
- To know the different data acquisition and digitisation procedures , as well as the creation and management of spatial repositories. Metadata.
- Understand and use the analytical capabilities of GIS.
- Know how to generate Digital Terrain Models and be able to analyse the potential for building derived models describing aspects related to terrain geometry.
- To know the different methods and techniques for visualisation and presentation of spatial analysis results.
- Know how to manage and take advantage of the resources provided by SDIs through the Internet.

4. OBJECTIVES

The aim is to introduce students to the knowledge and use of Geographic Information Systems (GIS, GIS), in terms of terminology, basic concepts, functionalities and applications.

They should be aware of the different data sources available , and the processes of converting them into spatial information suitable for a certain purpose.

The student should acquire the ability, at a basic level, to design and develop the analysis of a spatial problem with a significant environmental component using GIS methodologies.

6. COURSE ORGANIZATION

CONTENTS	
1	Vector GIS. Concepts. Components. Digital cartography. Alphanumeric databases. Introduction to the working environment. Basic functionalities. Preparation of the GIS data model. Editing. Topology. Catalogue of basic analysis tools. Systems reference systems. Automation
2	Raster GIS. Basic concepts. Basic analysis tools: queries. Classifications, map algebra, functions. Three-dimensional terrain models. Analysis and spatial modelling of continuous variables. Interpolation models.
3	Typical applications: Multi-criteria analysis: study of environmental impact or location of a certain activity. Spatial analysis and modelling of continuous variables. Interpolation models. Geostatistics

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Vector GIS. Task.	Work	No	No	20,00
Raster GIS. Task.	Work	No	No	20,00
Typical applications.	Work	Yes	Yes	50,00
GIS vector and raster concepts. On-line test	Activity evaluation with Virtual Media	No	No	10,00
TOTAL				100,00

Observations

Attendance at 70% of the classes will be compulsory for the presentation of the final work.

Observations for part-time students

The same evaluation criteria will be applied to part-time students as to full-time students. The time distribution of activities will be adapted to the particular conditions of each student when deemed necessary.

8. BIBLIOGRAPHY AND TEACHING MATERIALS
BASIC
LONGLEY, P.A., GOODCHILD, M.F., MAGUIRE, D.J. y RHIND, D.W. 2005. Geographic Information Systems and Science. 2ª Ed. John Wiley & Sons. Chichester.
BURROUGH, P.A y MCDONNELL, R. 1998. Principles of Geographical Information Systems (Spatial Information Systems and Geostatistics). Oxford University Press. Oxford.
BOSQUE SENDRA, J. 2000. Sistemas de Información Geográfica. 3ª Ed. Rialp, Madrid.
BERNHARDSEN, T. 2002. Geographic Information Systems. John Wiley & Sons, New York.