

## SUBJECT TEACHING GUIDE

### 579 - Geographic Information Systems

#### Master's degree in integrated management of water systems

Academic year 2023-2024

1. IDENTIFYING DATA					
Degree	Master's degree in integrated management of water systems			Type and Year	Compulsory. Year 1
Faculty	School of civil Engineering				
Discipline					
Course unit title and code	579 - Geographic Information Systems				
Number of ECTS credits allocated	3	Term	Semester based (2)		
Web					
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. CIENCIAS Y TECNICAS DEL AGUA Y DEL MEDIO AMBIENTE				
Name of lecturer	JAVIER MARIA SANCHEZ ESPESO				
E-mail	javier.sanchez@unican.es				
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.
- Analysis tools in vector and raster environments
- Management and modeling digital terrain models.
- Using models of spatial interpolation.
- Case Studies: multi-criteria analysis and hydrologic basin analysis.

#### 4. OBJECTIVES

Know and manage spatial information using the tools and methodologies of GIS.

Design, develop and interpretation of spatial information analysis using GIS methodologies oriented to the management of water systems.

#### 6. COURSE ORGANIZATION

##### CONTENTS

1	<p>Vector GIS. Concepts. Components. Digital mapping. Alphanumeric databases. Introduction to the working environment: basic functionality. Preparation of GIS data model. Edition. Topology. Catalog of basic analysis tools. Reference systems. Automation.</p>
2	<p>Raster GIS. Basic concepts. Basic analysis tools: queries, classification, map algebra functions. Three-dimensional terrain models. Spatial analysis and modeling of continuous variables. Interpolation models</p>
3	<p>Case studies: Multi-criteria analysis: environmental impact study location or location of a certain activity. Basin analysis: determination watershed, stream flow.</p>

#### 7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Vector GIS projects	Work	No	No	20,00
Raster GIS projects	Work	No	No	20,00
Final Project	Work	Yes	Yes	50,00
Final exam	Activity evaluation with Virtual Media	No	No	10,00
<b>TOTAL</b>				<b>100,00</b>
<b>Observations</b>				
<p>For the presentation of the work will be compulsory to attend 70% of classes. They will be observed the resolutions adopted in the ordinary session of the School meeting celebrated on June 10, 2010. Only for duly justified causes (eg sanitary restrictions), the evaluations may be organized remotely, with prior authorization from the Center's Directorate. It will be considered the equivalence among the numeric qualification and the qualitative one established in the Real Decreto RD1125 /2003.</p>				
<b>Observations for part-time students</b>				
<p>Part-time students will apply the same assessment criteria as full-time students. The temporary distribution of activities will be adapted to the particular conditions of each student when deemed necessary.</p>				

**8. BIBLIOGRAPHY AND TEACHING MATERIALS**

## BASIC

HARMON, J.E. y ANDERSON, S. 2003. The design and Implementation of Geographic Information Systems. John Wiley & Sons, Hoboken, New Jersey.

BERNHARDSEN, T. 2002. Geographic Information Systems. John Wiley & Sons, New York.

BOSQUE SENDRA, J. 2000. Sistemas de Información Geográfica. 3ª Ed. Rialp, Madrid.

BURROUGH, P.A y MCDONNELL, R. 1998. Principles of Geographical Information Systems (Spatial Information Systems and Geostatistics). Oxford University Press. Oxford.

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.