

**COURSE DATA****DATA SUBJECT**

**Code:** 33804  
**Name:** Geographical Information Systems I  
**Cycle:** Undergraduate Studies  
**ECTS Credits:** 6  
**Academic year:** 2025-26

**STUDY (S)**

Degree	Center	Acad. year	Period
1318 - Degree in Geography and the Environment	Facultat de Geografia i Història	2	Second quarter

**SUBJECT-MATTER**

Degree	Subject-matter	Character
1318 - Degree in Geography and the Environment	Geographic information systems I	COMPULSORY

**COORDINATION**

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**SUMMARY**

Geographic Information Systems are integrating geographic data and computer systems and thus enabling the analysis, visualization and understanding of complex issues of geographical knowledge involving the spatial distribution of the variables involved applications.

Together with SIG II (third year, first semester) complete the study of this subject set of methods and tools. GIS I course includes introductory matter, related sources, gathering and storage formats of the basic information and analysis functions, with special emphasis on aspects related to the physical environment.

**PREVIOUS KNOWLEDGE****RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE**

There are no specified enrollment restrictions with other subjects of the curriculum.

**OTHER REQUIREMENTS**

It is very convenient that students have studied the subjects Cartography I and II and Statistics.



It is advised that students have acquired a good understanding reading scientific texts in English and Windows management environment as well as data analysis programs such as Excel and SPSS.

## COMPETENCES / LEARNING OUTCOMES

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Be able to produce statistical information. Know how to use statistical software.

Be able to relate and synthesise cross-disciplinary territorial information.

Be able to use cartography and geographic information systems.

Be able to work independently.

Be able to work in interdisciplinary teams.

Get acquainted with geographic information systems as a tool for learning about and interpreting the territory and the environment.

Have computer skills related to the field of study.

Have oral and written communication skills in one's own language and in a foreign language.

Have research skills.

Learn about geographic information systems.

Show motivation for quality, responsibility and intellectual honesty.

## DESCRIPTION OF CONTENTS

### 1. Geographic Information Systems and their components

- Introduction to the study of GIS
- Components of a GIS
- Geographic information and mapping

### 2. Data models and ways of information storage

- Digital display of geo-referenced data
- The geographical information and its representation in maps
- Structures of spatial data: vector and raster



### 3. Basic functions

- Basic functions of a GIS visualization, query and retrieval of information
- Statistic analysis
- Spatial interpolation
- Vectortial Spatial Analysis
- Raster spatial analysis
- Publication of results, errors and quality control

### 4. Digital processing of satellite images and information extraction

- Fundamentals of remote sensing
- Digital processing of satellite images
- Integration of Remote Sensing GIS
- Development of thematic mapping: classification of multispectral images
- Applications of GIS in Environment

### 5. Spatial data entry and georeferencing

- Scanning.
- Georeferencing aster images.
- Projection systems

### 6. Digital Terrain Models

- The digital terrain model and its applications.
- Construction of MDT from point data: interpolation and TIN.
- Analysis of MDT and derivatives.
- The environmental significance of the topography.

## WORKLOAD

### PRESENCIAL ACTIVITIES

Activity	Hours
Theory	30,00
Other activities	15,00
Computer classroom practice	15,00
<b>Total hours</b>	<b>60,00</b>

### NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00



Individual or group project	0,00
Independent study and work	0,00
Preparation of lessons	60,00
Preparation for assessment activities	30,00
Resolution of case studies	0,00
<b>Total hours</b>	<b>90,00</b>

## TEACHING METHODOLOGY

Continuous attendance to theoretical and practical classes and making memories work is recommended. In case of difficulty attendance it is necessary to indicate the early going.

### 1. Classroom activities

In the lectures the fundamentals of each topic of the course will explain, looking for students to understand all the concepts and can handle in the analysis of spatial data. Active participation of students, both in raising doubts and discussion of the issues is needed.

Practical classes in computer classroom, students have to learn how to use ArcGIS Pro applications with specific exercises that will later be submitted for evaluation.

### 2. Preparation of the theoretical and practical

Students have a basic bibliography that includes manuals used applications. It is very convenient a previous reading to the explanations in class and developing schemes, which combined with the notes taken during class should be the subject of study and preparation for exams. Practices regarding many of the tasks undertaken in the classroom should be completed as self-employment for reporting.

### 3. Tutorials

Students have six hours a week for tutorials with the teacher and any relevant question is available also by email. During the course they will be set at least two hours of mandatory tutoring in order to guide students.

## EVALUATION

Only a theoretical and practical examination, at the end of the term, will be carried out on the date indicated by the Faculty.

The final grade will consist of:

- Theoretical and practical exam (60%). It is essential to pass the exam for consideration of the rest.
- Work in the classroom and guided practices (30%)
- Reports of complementary activities (10%); Must be delivered within the deadlines set at the end of each topic and count in both calls.



The second call will evaluate the theoretical and practical criteria of the subject in the same way as in the first call.

## REFERENCES

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- Lillesand, T.M. and Kiefer, R.W. (1987). Remote Sensing and Image Interpretation. Ed. Willey &Sons, 721p. New York
- Moreno Jiménez, A. y Cañada Torrecillas, R. (2005). Sistemas y análisis de la información geográfica : manual de autoaprendizaje con ArcGIS. Ra-ma, Madrid
- Santos Preciado, J.M. (2004). Sistemas de Información Geográfica. Universidad Nacional de Educación a Distancia. 459 p. Madrid
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- Peña Llopis, J. (2006). Sistemas de información geográfica aplicados a la gestión del territorio : entrada, manejo, análisis y salida de datos espaciales. Teoría general y práctica para ESRI ArcGIS 9, Club Universitario. Alacant