COURSE DATA

Data Subject	
Code	33804
Name	Geographical Information Systems I
Cycle	Grade
ECTS Credits	6.0
Academic year	2023 - 2024

Study (s)

Degree	Center	Acad. year	Period
1318 - Degree in Geography and the Environment	Faculty of Geography and History	2	Second term

Subject-matter

Degree	Subject-matter	Character
1318 - Degree in Geography and the Environment	625 - Geographic information systems I	Obligatory

Coordination

Name	Department
CALVO CASES, ADOLFO	195 - Geography
FANSA SALEH, GHALEB	195 - Geography

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.

OUTCOMES

1318 - Degree in Geography and the Environment

- Have oral and written communication skills in one's own language and in a foreign language.
- Have computer skills related to the field of study.
- Be able to work independently.
- Be able to work in interdisciplinary teams.
- Show motivation for quality, responsibility and intellectual honesty.
- Be able to produce statistical information. Know how to use statistical software.
- Have research skills.
- Learn about geographic information systems.
- Get acquainted with geographic information systems as a tool for learning about and interpreting the territory and the environment.
- Be able to relate and synthesise cross-disciplinary territorial information.
- Be able to use cartography and geographic information systems.

LEARNING OUTCOMES

- Capacity for managing GIS applications

- Practice different techniques in the classroom to you favor the autonomous student progress.

- Integrate content with the environmental interpretation systems.

- Relate the contents with other subjects of the degree.

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

ACTIVITY	Hours	% To be attended
Theory classes	30,00	100
Computer classroom practice	15,00	100
Other activities	15,00	100
Preparation of evaluation activities	30,00	0
Preparing lectures	15,00	0
Preparation of practical classes and problem	45,00	0
TOTAL	**150,00**	

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 10 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:

- Theorical 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.

REFERENCES

Basic

- Bourrough, P.A. (1992). Principles of Geographical Information Systems for Land Resources Assessment. Ed. Oxford Sciences Publ. 194 p. Oxford
- Bosque Sendra, J. (1997). Sistemas de Información Geográfica. Ed. Rialp, 451 p. Madrid
- Chuvieco Salinero, E. (2008) Teledetección espacial: la observación de la Tierra desde el espacio. Ed. Ariel, 592 p. Madrid
- 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

Additional

- Bonham]Carter, G.(1994). Geographic Information Systems for Geoscientists. Ed.Pergamon, 398 p. Ontario.
- Chuvieco, E. (1990). Fundamentos de Teledetección Espacial. Ed. Rialp, 453p. Madrid
- Gutiérrez Claverol, M. (1993). Teledetección. Geológica. Ed. Universidad de Oviedo. 427 p.
- Gupta, R. (1991). Remote Sensig Geology. Ed. Springer] Verlag, 356 p. Berlin
- Goodchild, M. et al (1993). Environmental Modelling with GIS. Ed. Oxford University Press, 488 p. New York.
- Journel, A.G. and Huijbregts, Ch. (1990). Mining Geostatistics. Academic Press. London
- 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. Rama, Madrid
- Santos Preciado, J.M. (2004). Sistemas de Información Geográfica. Universidad Nacional de Educación a Distancia. 459 p. Madrid