

Degree	Type	Year
4314828 Remote Sensing and Geographical Information Systems	OB	0

## Contact

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## Teachers

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## Teaching groups languages

You can view this information at the [end](#) of this document.

## Prerequisites

Prerequisites are not required

## Objectives and Contextualisation

At the end of the course, the student will be able to:

- Basic aspects of digitization and advanced aspects of topological structuring, as well as modeling tools, obtaining thematic cartography and quantification of the reliability of the products obtained.
- Proper use of the statistical concepts that underpin the automatic classification of multivariate data, and in particular those provided by satellite images as well as the most appropriate criteria for the visual interpretation of remote sensor images.

## Competences

- Continue the learning process, to a large extent autonomously.

- Identify and propose innovative, competitive applications based on the knowledge acquired.
- Integrate knowledge and use it to make judgements in complex situations, with incomplete information, while keeping in mind social and ethical responsibilities.
- Use acquired knowledge as a basis for originality in the application of ideas, often in a research context.
- Use different specialised GIS and remote sensing software, and other related software.
- Use the different techniques for obtaining information from remote images.
- Write up and publicly present work done individually or in a team in a scientific, professional context.

## **Learning Outcomes**

1. Continue the learning process, to a large extent autonomously.
2. Identify and propose innovative, competitive applications based on the knowledge acquired.
3. Integrate knowledge and use it to make judgements in complex situations, with incomplete information, while keeping in mind social and ethical responsibilities.
4. Show expertise in using digitalisation and topological structuring tools, modelling tools, and tools for supervised, unsupervised and mixed image classification.
5. Use acquired knowledge as a basis for originality in the application of ideas, often in a research context.
6. Work with the statistical concepts underpinning the automatic classification of satellite images, and the most suitable criteria for visually interpreting remote images.
7. Write up and publicly present work done individually or in a team in a scientific, professional context.

## **Content**

### **PHOTOINTERPRETATION**

1. Visual techniques for identifying land uses and land covers.
2. Recognition of different types of land uses and land covers.
3. Photointerpretation: Main applications in the study of the natural and artificial environment.
4. Interpretation of multispectral images.
5. Cartography of support for photointerpretation.

### **STATISTICAL METHODS**

1. Introduction to multivariate data. Characterization of distributions. Normality test. Correlation. Implications in Remote Sensing. Standardization. Principal Component Analysis.
2. Statistical distances between individuals, populations and between individuals and populations. Implications of the scaling of the variables. Divergence measures.
3. Obtaining new information (multitemporality, collateral data, indexes and transformations). Information reduction from the samples and from the variables. Introduction to obtaining continuous variables and categorical variables: linear and non-linear, simple and multiple regression, classification, etc.
4. Multiple regression applied to the interpolation of climatic surfaces.
5. Generalized linear models applied to obtaining suitability surfaces based on the ecological niche modelling.
6. Hierarchical and non-hierarchical classification. Supervised, unsupervised and hybrid classification; fuzzy classification.
7. Segmentation of images. Scales and scene models. Processing methods that take spatial information into account. Segmentation methods. Classification by segments.
8. Neural networks.
9. Generalization of results in categorical cartography. Direct methods and smart methods.
10. Verification of results in binary cartography. Sampling.
11. Verification of results in categorical cartography. Sampling.

## **Activities and Methodology**

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Master classes / exhibitions	38	1.52	1, 2, 3, 4, 5, 6, 7
Type: Supervised			
Classroom practices	35	1.4	1, 2, 3, 4, 5, 6, 7
Tutorials	2	0.08	1, 2, 3, 4, 5, 6, 7
Type: Autonomous			
Personal study	10	0.4	1, 2, 3, 4, 5, 6, 7
Reading of articles / reports of interest	1	0.04	1, 2, 3, 4, 5, 6, 7
Writing reports	64	2.56	1, 2, 3, 4, 5, 6, 7

Principal working language: spanish (spa), although the bibliographic materials may be in other languages, mostly English.

In this module there are 3 groups of learning activities:

- Targeted activities consist of classes of theory and practices that will be carried out in a specialized computer room. At the beginning of each of the subjects that make up the module, the teachers will explain the structure of the theoretical-practical contents, as well as the evaluation method.
- Supervised activities consist of classroom practices that will allow you to prepare the work and exercises of each subject, as well as tutorial sessions with the teachers in case the students request it.
- Autonomous activities are a set of activities related to the elaboration of works, exercises and exams, such as the study of different material in the form of journal articles, reports, data, etc., defined according to the needs of autonomous work of each student

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

## Assessment

### Continuous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Preparation of works	100 %	0	0	1, 2, 3, 4, 5, 6, 7

*The regular evaluation of this module consists is as follows:*

- The accomplishment of different practical works proposed throughout the teaching of the module and delivered within the fixed term, that will be worth the 100 % of the final note. A correct formal presentation and careful preparation will be assessed.

*Aspects to take into account.*

- Regular class attendance is highly recommended in order to follow the lessons properly. Follow on through streaming is only justified in cases of physical impossibility for face-to-face assistance, since an important part of the experiences and learning are fully achieved through contact with the teaching staff and classmates.
- If you have to deliver practical work, this delivery must be done within the deadlines for them to be evaluated.
- When being possible to start the tasks for each evaluation activity, or at the beginning of them, Lecturers will inform about the procedures to be followed for reviewing all grades awarded, and the date on which such a review will take place.

#### *Extraordinary exams.*

- The exams or other evaluation procedures not reaching the minimum mark of 5 out of 10 must be repeated. This extraordinary exam is unique.
- Students will have the opportunity to take an extraordinary exam the day or days scheduled by the faculty.

#### *The single assessment evaluation of this module is as follows:*

This module also includes the possibility of taking advantage of the single assessment option, which must take into account the following aspects:

- Single assessment assumes a single assessment date but not a single assessment activity.
- The accomplishment of one or more practical works proposed throughout the teaching of the module and delivered within the fixed term, that will be worth the 100 % of the final note. A correct formal presentation and careful preparation will be assessed.
- The single assessment will also be competency-based, that is, with the training activities the student must demonstrate that they are capable of carrying out the tasks provided for in the subject and these activities will have the same level of demand as those that are part of the course of continuous evaluation.
- Students wanting to take the single evaluation will have to communicate it between October the 5th and October the 19th, 2023, and they will not be able to do it at any other time during the course.
- Single assessment tests may coincide with dates reserved for continuous assessment and, if necessary, one week will be available to carry out face-to-face single assessment tests.

#### *Cheating: Copies and plagiarisms.*

- By copies, we refer to the evidence that the work, project, exam, etc has been partially or totally created/answered without the intellectual contribution of the author. In this definition, we also include the proven attempt to copy in the exams and delivered works and projects and the violation of the laws that assure intellectual authorship. Plagiarisms refer to the works and texts from other authors that someone pretends to be his/her own creation. It is a crime against intellectual property. In order to avoid committing plagiarism, quote all the sources that you use when writing the report of a project. According to UAB's law, copies and plagiarisms or any other attempt to alter the results of one's own evaluation or someone else's -allowing to copy, for example- implies a result in the corresponding part (theory, problems or practical tasks) of a 0 and, in this case, the student will fail the subject. This does not limit the right to take academic and legal actions against those who have participated. See UAB documentation about copies and plagiarisms  
[http://wuster.uab.es/web\\_argumenta\\_obert/unit\\_20/sot\\_2\\_01.html](http://wuster.uab.es/web_argumenta_obert/unit_20/sot_2_01.html)

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<http://www.ign.es/siose/documentacion.jsp>

Manual de Fotointerpretación SIOSE2005.

[http://www.ign.es/siose/Documentacion/Guia\\_Tecnica\\_SIOSE/Manual\\_Fotointerpretacion\\_SIOSE2005.pdf](http://www.ign.es/siose/Documentacion/Guia_Tecnica_SIOSE/Manual_Fotointerpretacion_SIOSE2005.pdf)

Anexo IV: Fichas Fotointerpretación Zonas Agrícolas y Forestales - Coberturas simples

[http://www.ign.es/siose/Documentacion/Guia\\_Tecnica\\_SIOSE/070206\\_Manual\\_Fotointerpretacion\\_anexoIV\\_ficha](http://www.ign.es/siose/Documentacion/Guia_Tecnica_SIOSE/070206_Manual_Fotointerpretacion_anexoIV_ficha)

Anexo IV: Fichas Fotointerpretación Zonas Agrícolas y Forestales - Asociaciones

[http://www.ign.es/siose/Documentacion/Guia\\_Tecnica\\_SIOSE/070122\\_Manual\\_Fotointerpretacion\\_anexoIV\\_ficha](http://www.ign.es/siose/Documentacion/Guia_Tecnica_SIOSE/070122_Manual_Fotointerpretacion_anexoIV_ficha)

Anexo IV: Fichas Fotointerpretación Coberturas Artificiales

[http://www.ign.es/siose/Documentacion/Guia\\_Tecnica\\_SIOSE/070727\\_Manual\\_Fotointerpretacion\\_anexo\\_IV\\_ficha](http://www.ign.es/siose/Documentacion/Guia_Tecnica_SIOSE/070727_Manual_Fotointerpretacion_anexo_IV_ficha)

[http://www.ign.es/siose/Documentacion/Guia\\_Tecnica\\_SIOSE/061101\\_Manual\\_Fotointerpretacion\\_anexoIV\\_Tabla](http://www.ign.es/siose/Documentacion/Guia_Tecnica_SIOSE/061101_Manual_Fotointerpretacion_anexoIV_Tabla)

Guía técnica del Mapa de Usos y Coberturas Vegetales del Suelo de Andalucía 1:25.000. Conté imatges de cobertes.

<http://www.juntadeandalucia.es/medioambiente/site/rediam/menuitem.04dc44281e5d53cf8ca78ca731525ea0/?v=1>

Mapa forestal de España escala 1:25.000 Manual de fotointerpretación. No conté imatges de boscos però és un bon recull de metodologia i de descripció de categories.

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Tortosa, Delio: "Remote Sensing Course". This guide was produced as part of a remote sensing course for Lake Superior State University. El Topic 5 està dedicat a fotointerpretació.

<http://hosting.soonet.ca/eliris/remotesensing/bl130intro.htm>

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## Software

MiraMon, ArcGIS, QGIS, ENVI, Office Microsoft

## Language list

Name	Group	Language	Semester	Turn
(TE) Theory	1	Spanish	second semester	morning-mixed