



Universidad de Jaén

School of Engineering of Jaén

Applied Remote Sensing

2024-2025

Grado en Ingeniería Geomática y Topográfica (E.P.S. Jaén)



CREA



Acceso Mayores 40

Guías docentes UJA

Horarios de tutorías

Llamamientos PAU

Movilidad (Coordinador)

P.O.D.

Solicitud bilingüismo

Syllabus 2024-25 - 13213012 - Applied Remote Sensing (Teledetección aplicada)

Caption

- Level 1: Tutorial support sessions, materials and exams in this language
- Level 2: Tutorial support sessions, materials, exams and seminars in this language
- Level 3: Tutorial support sessions, materials, exams, seminars and regular lectures in this language

[Back](#)[Full version \(Spanish\)](#)[English](#)

DEGREE:

Grado en Ingeniería geomática y topográfica

FACULTY:

SCHOOL OF ENGINEERING OF JAÉN

ACADEMIC YEAR:

2024-25

COURSE:

Applied Remote Sensing

SYLLABUS

1. COURSE BASIC INFORMATION

NAME: Applied Remote Sensing

CODE: 13213012

ACADEMIC YEAR: 2024-25

LANGUAGE: English

LEVEL: 1

ECTS CREDITS: 6.0

YEAR: 4

SEMESTER: PC

2. LECTURER BASIC INFORMATION

NAME: DELGADO GARCÍA, JORGE

DEPARTMENT: U119 - INGENIERÍA CARTOGR. GEODESICA Y FOTOGRAM

FIELD OF STUDY: 505 - INGENIERÍA CARTOGRÁFICA, GEODÉSICA Y FOTOGRAMETRÍA

OFFICE NO.: A3 - 320

E-MAIL: jdelgado@ujaen.es

P: 953-212468

WEBSITE: <http://coello.ujaen.es/perfil.php?option=9>ORCID: <https://orcid.org/0000-0001-9988-988X>

LANGUAGE: -

LEVEL: 1

NAME: FERNÁNDEZ DEL CASTILLO, TOMÁS MANUEL

DEPARTMENT: U119 - INGENIERÍA CARTOGR. GEODESICA Y FOTOGRAM

FIELD OF STUDY: 505 - INGENIERÍA CARTOGRÁFICA, GEODÉSICA Y FOTOGRAMETRÍA

OFFICE NO.: A3 - 317

E-MAIL: tfernan@ujaen.es

P: 953212843

WEBSITE: <http://coello.ujaen.es>ORCID: <https://orcid.org/0000-0002-6822-775X>

LANGUAGE: -

LEVEL: 1

3. CONTENT DESCRIPTION

Unit 1. Introduction to remote sensing applications.**Unit 2. Remote sensing applications in agricultural and forest resources.**

2.1 Monitoring of agricultural areas. Multitemporal classification.

2.2 Monitoring of forest areas. Deforestation control.

Unit 3. Applications in Earth Sciences and Mining.

3.1 Classification of images for lithological mapping.

Unit 4. Applications in Hydrology, Oceanography and Cryosphere.

4.1 Quality monitoring of water surfaces.

4.2 Determination of the height of water surfaces.

4.3 Control of maritime traffic. Spill monitoring.

4.4 Monitoring of ice and snow surfaces.

Unit 5. Remote sensing applications in atmospheric and climatic studies.

5.1 Estimation of climatic parameters. Earth's surface temperature.

5.2 Monitoring of atmospheric pollutants.

Unit 6. Management of natural disasters by remote sensing.

6.1 Analysis of deformations produced by landslides.

6.2 Analysis of deformations produced by earthquakes.

6.3 Monitoring of forest fires and recovery work in affected areas.

Unit 7. Urban Remote Sensing.

7.1 Classification of urban areas by classification of satellite images. Evolution of cities.

7.2 Determination of climatic parameters in cities. Heat island effect.

Unit 8. High resolution remote sensing.

The practical program will consist of the development of a total of 15 activities based on real cases by the student, related to the topics covered in this course, including the analysis of aspects related to land, marine, air pollution, management of catastrophes, etc.

Activity 1. ESA SNAP processing system.

Activity 2. Multitemporal classification of crops from multispectral images.

Activity 3. Analysis of deforestation from RADAR images.

Activity 4. Preparation of lithological cartography from the classification of multispectral images.

Activity 5. Monitoring of water quality (multispectral images).

Activity 6. Altimetry in marine areas and water cover.

Activity 7. Control of maritime traffic. Spill detection.

Activity 8. Monitoring of ice and snow surfaces.

Activity 9. Monitoring of atmospheric pollutants.

Activity 10. Monitoring of flooded areas.

Activity 11. Analysis of deformations of the Earth's surface caused by earthquakes and landslides using RADAR interferometry techniques.

Activity 12. Monitoring of areas affected by forest fires.

Activity 13. Analysis of the evolution of urban areas through combined use of multispectral images and RADAR.

Activity 14. Characterization of urban heat islands.

Activity 15. Obtaining MDE and orthoimages from stereoscopic models of high and very high resolution satellites.

4. COURSE DESCRIPTION AND TEACHING METHODOLOGY

The course will be developed through a methodological model based on the flipped classroom and project-based learning. In this way, the subject is structured into a total of 14 activities with a duration of 4 hours each, which together with the presentation session (2 hours) and the evaluation session (2 hours), completes the dedication of this subject.

These activities will be focused on the development of real case studies linked to obtaining information of interest from the treatment of images captured by sensors installed on satellites.

Each activity will begin with the sending of a reference material to the students one week before the first face-to-face session of their activity is held. This material will gather the basic information related to the theoretical and methodological aspects for the development of this real case, and will be accompanied by an application example that the students must develop before the first session. Likewise, prior to the completion of the first session, students must complete a questionnaire in order to establish which elements they consider should be reinforced.

The first session will have a double objective, on the one hand, to delve into those aspects that are considered basic for the development of the project, with special attention to those pointed out by the students themselves; and on the other hand, to review the work carried out by the students based on the example data provided to carry out this project. The second part of the session (1 hour) will be devoted to the analysis of the results and the evaluation of the potential of Remote Sensing against other techniques to achieve these objectives. Finally, the selection of the work areas in the that students should develop their own projects.

The second session will be devoted to the analysis of the cases developed by the different students, and the correction of the most frequent errors and proposals for improvements to said works (presentation, structure, content, etc.). Likewise, it will connect with other possible remote sensing applications.

In this sense, and taking into account the usual number of students in this subject, it is not considered advisable to differentiate between theory and practice.

Students with special educational needs should contact the Student Attention Service (Servicio de Atención y Ayudas al Estudiante) in order to receive the appropriate academic support

5. ASSESSMENT METHODOLOGY

In accordance with the methodological model used in this subject, it is considered essential to consider the active participation of students in the classroom environment, in the sense of carrying out the work prior to the sessions, participation in face-to-face sessions and development of projects and preparation of the corresponding reports.

The evaluation will be based on three components:

Attendance and participation (10%). It includes carrying out the work prior to the face-to-face sessions, and attendance and active participation in them.

Assessment of theoretical content (25%). It will consist of taking a test through the LMS platform of the University of Jaén, in which the level of knowledge of the students on the theoretical aspects directly related to the projects carried out throughout the course is analyzed.

Evaluation of the reports of the developed projects (65%). Within the model considered in this subject, this component is of great importance (project-based learning). The evaluation will basically consist of the presentation of a report, as well as its presentation and debate in the second face-to-face session of each of the activities.

For aspect S1, the competences CB2R, CB3R, CB5R, CE10R, CE13R, CE14R will be evaluated, hoping to achieve the result R13.

For aspect S2, the competences CE10R, CE13R, CE14R, CE26 will be evaluated, hoping to achieve result 13.

Finally, for aspect S3, the competences CT4, CT6, CE10R, CE13R, CE14R, CE26 will be evaluated, hoping to achieve result 13.

6. BOOKLIST ([Access the bibliography in the Library catalog](#))

MAIN BOOKLIST:

- Urban remote sensing [edited by] Qihao Weng, Dale Quattrochi, and Paolo Gamba. Edition: Second edition. Author: Weng, Qihao, editor. Publisher: CRC Press ([Library](#))
- Advances in environmental remote sensing : sensors, algorithms, and applications edited by Qihao Weng. Edition: -. Author: Weng, Qihao, ed. lit.. Publisher: CRC Press ([Library](#))
- Advances in environmental remote sensing. Edition: -. Author: Danson, F. Mark, ed. lit.. Publisher: John Wiley & Sons ([Library](#))
- Radar Remote Sensing of Urban Areas [electronic resource] edited by Uwe Soergel.. Edition: 1st ed. 2010.. Author: Soergel, Uwe. editor.. Publisher: Springer Netherlands ([Library](#))
- Satellite Radar Interferometry [electronic resource] : Subsidence Monitoring Techniques by V. B. H. (Gini) Ketelaar.. Edition: 1st ed. 2009.. Author: Ketelaar, V. B. H. (Gini). author.. Publisher: Springer Netherlands ([Library](#))

ADDITIONAL BOOKLIST:

- Manual of remote sensing. Edition: 3rd. ed. Author: Ryerson, Robert A., ed. lit.. Publisher: John Wiley and son ([Library](#))

7. SUSTAINABLE DEVELOPMENT GOALS

Hambre cero

Agua limpia y saneamiento

Energía asequible y no contaminante

Ciudades y comunidades sostenibles

Producción y consumo responsables

Acción por el clima

Paz, justicia e instituciones sólidas

DETAILED INFORMATION

The characteristics of this subject, focused on the development of remote sensing projects in different fields, lead to the analysis of different basic problems related to the sustainable development of our planet. Thus, for example, methods for monitoring deforestation, crops, or climate change are analyzed, as well as the effects of large cities on the climate itself.

In this aspect, it is important to highlight the crucial role of geospatial information (in this case, with a global character through the application of remote sensing methods) with respect to these issues.

8. VIRTUAL / CLASSROOM TEACHING SCENARIO

In accordance with the recommendations made by the Higher Polytechnical School of Jaén regarding the number of students envisaged in this degree, and considering the optional nature of the subject, it is considered that there should be no problem regarding the capacity of the planned classroom in conditions of compliance with the social separation established by the competent governments. In this way, it is considered that all the aspects provided in this teaching guide can be fulfilled.

In this sense, the teaching of this subject will be face-to-face, as well as the attention to the students through the corresponding tutorials. Therefore, it is considered that there is no definition of a mixed scenario in accordance with the regulations approved by the Governing Council of the University of Jaén.

The School may vary the attendance percentage depending on the number of students and the capacity of the classroom / laboratory according to sanitary measures. In the case of less than 100% attendance, there will be periodic rotation of students as determined by the School.

Formation activities:

Formation activities	Format (face-to-face / non-face-to-face)	Teaching methodology. Description.
Expository classes of theory/practical sessions	100% face-to-face	Development of 30 sessions of 2 hours each in the assigned classroom/lab.
Tutorials	100% face-to-face	Tutoring of attention to the students.

Evaluation system:

Evaluation activities (Ordinary / Extraordinary Call)

Assessment test	Face-to-face format	Description	Percentage
Yes (test of theoretical knowledge)	Yes	Theoretical knowledge test developed through LMS platform in the classroom itself.	25%
No (evaluation of practical work)	Yes (+ autonomous student work)	Delivery of memories of the activities developed in the practical sessions.	65%
No (participation)	Yes	Active participation in the theoretical and practical sessions and activities of the LMS platform.	10%

The purpose of the evaluation system is to verify that the students have acquired the competences that allow them to develop the expected results of the subject.

The evaluation will consist of 3 parts: a) attendance and participation, b) evaluation of theoretical knowledge, c) development of exercises and practical activities (development of projects based on real case studies).

The evaluation of theoretical knowledge will be carried out through a test that will be developed through the virtual teaching platform of the University of Jaén. This test will be carried out in the classroom assigned for teaching the subject with a face-to-face character.

The evaluation of the practical component will be evaluated by means of the delivery of the reports corresponding to the real cases developed in the practical sessions complemented with the autonomous work by the students.

The final grade will be the result of a weighted average between the qualification of the four parts (attendance; participation; theory; practices), with their weights being 0.1, 0.25 and 0.65, respectively. To pass the course it will be necessary to achieve a minimum score of 4 points in the theoretical and practical knowledge parts, and it will be considered passed if the final score is greater than 5.0.

The evaluation regarding practical knowledge will be based on the presentation, and where appropriate, defense of the work carried out by the students in them. Those people who do not pass this evaluation may choose to take a global skills test for said practical part.

9. VIRTUAL TEACHING SCENARIO

In case of need to resort to a non-face-to-face scenario, the following adaptations will be made to what is stated as starting elements in this teaching guide.

Theoretical sessions. They will be taught through videoconference systems synchronously or asynchronously depending on the availability of human and material resources enabled for this purpose by the University of Jaén.

Practical sessions. They will be taught through videoconference systems synchronously or asynchronously depending on the availability of human and material resources enabled by the University of Jaén for this purpose. The work of the students will be carried out promoting the use of computer programs of free use and virtual machines on reduced data sets to avoid calculation problems.

In any case, the recording of these sessions by the students is totally prohibited, except with the express authorization of the teaching staff.

Evaluation system. The applied evaluation system will not undergo changes, except that the tests will be carried out through the computer platform enabled by the University of Jaén for this purpose.

Formation activities:

Formation activities	Format (face-to-face / non-face-to-face)	Teaching methodology. Description.
Theory/practical sessions	Non-face-to-face	Development of 30 sessions of 2 hours each using the human and material resources enabled by the University of Jaén for this purpose.
Tutorials	Non-face-to-face	Tutoring of attention to the students using the human and material resources enabled by the University of Jaén for this purpose.

Evaluation system:

Evaluation activities (Ordinary / Extraordinary Call)

Assessment test	Face-to-face format	Description	Percentage
Yes (test of theoretical knowledge)	No	Theoretical knowledge test developed through LMS platform using the human and material resources enabled by the University of Jaén for this purpose.	25%
No (evaluation of practical work)	No (+ autonomous student work)	Delivery of memories of the activities developed in the practical sessions.	65%
No (participation)	No	Attendance/participation at theoretical and practical sessions.	10%

DATA PROTECTION CLAUSE (on line exams)

Institution in charge of data processing: Universidad de Jaén, Campus Las Lagunillas, s/n, 23071 Jaén

Data Protection Delegate: dpo@ujaen.es

Purpose: In accordance with the Universities Law and other national and regional regulations in force, carrying out exams and assessment tests corresponding to the courses students are registered in. In order to avoid frauds while sitting the exam, the exam will be answered using a videoconference system, being able the academic staff of the University of Jaén to compare and contrast the image of the person who is answering the exam with the student's photographic files. Likewise, in order to provide the exam with evidential content for revisions or claims, in accordance with current regulation frameworks, the exam will be recorded and stored.

Legitimacy: compliance with legal obligations (Universities Law) and other national and regional regulations currently in force.

Addressees: service providers who are the owners of the platforms where the exams are carried out and with whom the University of Jaén has signed the corresponding data access contracts.

Storage periods: those established in current in force regulations. In the specific case of exam videoconference recordings, not before the examination records and transcripts are closed or the exam can still be reviewed or challenged.

Rights: you can exercise your right of access, amendment, cancellation, opposition, suppression, limitation and portability by sending a letter to the postal or electronic address indicated above. In the event that you consider that your rights have been violated, you may submit a complaint to the Andalusian Council for Transparency and Data Protection www.ctpdandalucia.es

CLASS RECORDING CLAUSE PERSONAL DATA PROTECTION

Person in charge: Universidad de Jaén, Paraje Las Lagunillas, s/n; Tel.953 212121; www.ujaen.es

Data protection delegate (DPO): TELEFÓNICA, S.A.U. ; Email: dpo@ujaen.es

Procedure aim: To manage proper recordings of teaching sessions with the aim of facilitating learning process under a multimodal and/or online teaching

Period for record storage: Images will be kept during legal term according to regulations in force

Legitimacy: Data will be managed according to legal regulations (Organic Law 6/2001, December 21, on Universities) and given consent provided by selecting corresponding box in legal admission documents

Data recipients (transfers or assignments): Any person allowed to get access to every teaching modality

Rights: You may exercise your rights of access, rectification, cancellation, portability, limitation of processing, deletion or, where appropriate, opposition. To exercise these rights, you must submit a written request to the Information, Registration and Electronic Administration Service of the University of Jaen at the address above, or by e-mail to the address above. You must specify which of these rights you are requesting to be satisfied and, at the same time, you must attach a photocopy of your ID card or equivalent identification document. In case you act through a representative, legal or voluntary, you must also provide a document that proves this representation and identification. Likewise, if you consider that your right to personal data protection has been violated, you may file a complaint with the Andalusian Data Protection and Transparency Council www.ctpdandalucia.es

Campus Las Lagunillas s/n | 23071 - Jaén

[Soporte de guías docentes](#)

[Accesibilidad](#) | [Aviso legal](#) | [Sugerencias](#)

[Servicios académicos](#) | [Servicios administrativos](#) | [Extensión universitaria](#) | [Información general](#) | [Operaciones](#) |