

28319 - Remote Sensing

Syllabus Information

Academic Year: 2022/23

Subject: 28319 - Remote Sensing

Faculty / School: 103 - Facultad de Filosofía y Letras

Degree: 419 - Degree in Geography and Land Management

ECTS: 6.0

Year: 3

Semester: First semester

Subject Type: Compulsory

Module:

1. General information

2. Learning goals

3. Assessment (1st and 2nd call)

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The teaching methodology and the order of the contents logically reflects the process of successive approximation, in terms of increasing complexity, to the critical use of satellite imagery in analysing and modeling of territorial processes.

This approach, which is already consolidated in university teaching in remote sensing, deliberately avoids teaching exclusively based on dedicated software because it is not suitable for achieving the desired learning objectives. This does not prevent, but favors, that students acquire the technical-instrumental skills required for an operational implementation of the competencies to be acquired in this matter, but on a theoretically and methodologically well-founded basis.

4.2. Learning tasks

The course includes the following learning tasks:

- **Lectures** (30 hours).
- **Practice sessions** (26 hours, 16 of them in two groups of students, Type 3). Practical application of techniques of visual analysis and digital processing of satellite images, which involves learning skills in the use of specific remote sensing software.
- **Field work** (1 hour). Divided into small groups (maximum 8 students), students carry out a practical exercise on the field of spectroradiometry and the performance of a practical field spectroradiometry exercise.
- **Autonomous work study** (88 hours).
- **Assessment - two written exams** (3 hours each).

4.3. Syllabus

The lecture course will address the following main issues:

1. Introduction: Basic concepts an evolution of remote sensing. Epistemological and technological context.
2. Nature of remote sensing data: Electromagnetic spectrum. Physical principles of remote sensing and atmospheric

interactions. Typical spectral signatures.

3. Satellite remote sensing missions and programs. Resolution of a sensor system.
4. Visual interpretation: Image enhancements. RGB and HSI colour composites.
5. Pretreatments -geometric and atmospheric corrections- and filtering -spatial enhancements-.
6. Fundamentals of digital images processing: Generation of derived variables (spectral indices, PCA). Digital image classification.
7. Remote sensing and GIS integration: Remote Sensing Applications.

4.4. Course planning and calendar

- First 6 weeks: theoretical-practical sessions, items 1 to 4 of the program and delivery of practical work.
- 6th week: fieldwork session on spectroradiometry.
- After the 6th week: first written assessment exam.
- 7th to 15th weeks: theoretical-practical sessions, items 5 to 7 of the program and delivery of practical work.
- Last week: second written assessment exam.
- Global evaluation exam at the end of the cuatrimester, on the day set by the Faculty.

For further details concerning the timetable, classroom and other information of the course please refer to the *Facultad de Filosofía y Letras* web site (<https://fyl.unizar.es/horario-de-clases#overlay-context=horario-de-clases>)

4.5. Bibliography and recommended resources

- BB** Campbell, James B. Introduction to remote sensing / James B. Campbell. 3rd ed London [etc.] : Taylor & Francis, 20
- BB** Chuvieco Salinero, Emilio. Fundamentals of satellite remote sensing / Emilio Chuvieco. 2ª ed. Boca Raton: CRC, 20
- BB** Chuvieco Salinero, Emilio. Teledetección ambiental : la observación de la Tierra desde el espacio / Emilio Chuvieco. Ariel, 2010
- BB** Gibson, Paul J. Introductory remote sensing: digital image processing and applications / Paul J. Gibson and Clare H. Routledge, 2000
- BB** Gibson, Paul. Introductory remote sensing, principles and concepts / Paul J. Gibson; with contributions to the text by Website development by John Keating. [London]: Routledge, 2000
- BB** Lillesand, Thomas M. Remote sensing and image interpretation / Thomas M. Lillesand, Ralph W. Kiefer, Jonathan W Hoboken, NJ: John Wiley, cop. 2008
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- BC** Chuvieco Salinero, Emilio. Fundamentos de teledetección espacial / Emilio Chuvieco. 3a. ed. rev. Madrid: Rialp, D.L
- BC** Curran, Paul J. Principles of remote sensing / Paul J. Curran. London: Longman, 1985
- BC** Girard, Michel C. Télédétection appliquée: zones tempérées et intertropicales / Michel C. Girard, Collete M. Giarard; Brachet . Paris [etc.]: Manson, 1989
- BC** Jensen, J.R. Introductory digital image processing: a remote sensing perspective / J. R. Jensen. 3th. ed. Englewood 2004
- BC** People and pixels: linking remote sensing and social science / D. Liverman, E.F. Moran, P.C. Stern (eds.). Washington Council; National Academy Press, 1998. [(PDF disponible en <http://nap.edu>).]
- BC** Pinilla Ruiz, Carlos. Elementos de teledetección / Carlos Pinilla Ruiz. Madrid: RA-MA, D.L. 1995.
- BC** Remote sensing. Course book. [1] / Courseteam J.J.M. Leinders... [et al.]. Heerlen: Open Universiteit, 1989
- BC** Scanvic, Jean-Yves. Teledetección aplicada: cartografía, geología estructural, exploración minera, medio ambiente, [traducido por Gregorio Ochoa y Angel Valverde]. Madrid: Paraninfo, 1989.
- BC**
- Sobrino, José A. Teledetección / José A. Sobrino (ed.). Valencia: AECl, D.L.2000.