

28319 - Remote Sensing

Syllabus Information

Academic Year: 2019/20

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

1.1.Aims of the course

1.2.Context and importance of this course in the degree

1.3.Recommendations to take this course

2.Learning goals

2.1.Competences

2.2.Learning goals

2.3.Importance of learning goals

3.Assessment (1st and 2nd call)

3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

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** (16 hours).
- **Practice sessions** (36 hours). 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.
- **Seminars - group activities** (3 hours). The first seminar aims to guide the guided assignment that students should prepare, in groups of four, around fields of application of space remote sensing (1 hour). The second seminar consists on the presentation and discussion of the results of the assignment (2 hours).
- **Guided assignment** (15 hours). It can take two different modalities:
 - In the case of continuous assessment, this work on remote sensing applications is developed by students

in groups of four, under the teacher's supervision. This activity, which starts in the first seminar concludes with the presentation and discussion at the second seminar.

- In the case of global assessment, this work is carried out individually, but also supervised by the teacher, involving a greater bibliographic/research effort.
- **Field work** (1 hour). Divided into small groups (maximum 8 students), students carry out a practical exercise on the field of spectroradiometry.
- **Autonomous work study** (75 hours).
- **Assessment - two written exams** (2 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: Generarion 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.
- 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.
- 9th week: first seminar.
- 14th week: second seminar.
- Last week: second written assessment exam.

For further details concernig the timetable, classroom and other information of the course please refer to the *Facultad de Filosofia 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
- BB** Sabins, Floyd F. Remote sensing : principles and interpretation / Floyd F. Sabins. 3rd ed. New York: W.H. Freeman :
- 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: 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.