60403 - Geographic Information Analysis: Remote Sensing

Syllabus Information

Academic Year: 2021/22

Subject: 60403 - Geographic Information Analysis: Remote Sensing

Faculty / School: 103 - Facultad de Filosofía y Letras

Degree: 352 - Master's in Geographic Information Science and Technology for Land Management: Geographic Information Systems and Remote Sensing

ECTS: 12.5

Year: 1

Semester: Annual

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 learning and teaching methodology developed in the course is aimed to promote the achievement of the learning objectives. A wide range of teaching and learning activities is implemented, such as lectures, practice sessions, practical exercises, individual or group activities, guided tasks and study.

A high level of student participation will be required from all students throughout the course.

Extensive material will be available *via* the Moodle site of the course. This offers a variety of resources including a repository of the lecture notes used in class, a course syllabus as well as other forms of course-specific materials, including a discussion forum.

4.2. Learning tasks

The course includes the following learning tasks:

Topic 4.1.- Visual analysis of remote sensing images

- Lectures: 7.5 hours
- Interactive, individual or group activities*:* 7.5 hours
- Study: 19 hours
- Guided tasks: 50 minutes per student

Topic 4.2 Advanced digital processing of remote-sensing images

- Lectures: 15 hours
- Interactive, individual or group activities: 22.5 hours
- Study: 37 hours
- Guided tasks: 50 minutes per student
- Assessment: 75 minutes

Topic 4.3 Digital image classification and multi-temporal analysis
- Lectures: 7.5 hours
- Interactive, individual or group activities: 7.5 hours
- Field work: 17.5 hours
- Study: 29 hours
- Guided tasks: 50 minutes per student

Topic 4.4 Radar image interpretation
- Lectures: 15 hours
- Interactive, individual or group activities: 22.5 hours
- Study: 37 hours
- Guided tasks: 85 minutes per student
- Assessment: 50 minutes

Topic 4.5 Interpretation of hyperspectral image
- Lectures: 7.5 hours
- Interactive, individual or group activities: 7.5 hours
- Study: 17 hours
- Guided tasks: 50 minutes per student
- Assessment: 75 minutes

Topic 4.6 Interpretation of the LiDAR images
- Lectures: 6 hours
- Interactive, individual or group activities: 9 hours
- Study: 10 hours
- Guided tasks: 50 minutes per student
- Assessment: 50 minutes

4.3. Syllabus

The course will address the following topics:

Topic 4.1.- Visual analysis of remote sensing images
- Introduction and conceptual issues.
- Visual analysis of satellite images: advantages and disadvantages.
- Photo-interpreter profile.
- Stages and levels of photo-interpretation.
- Methods and criteria for visual interpretation.
- Mapping projects based on remote sensing.

Topic 4.2 Advanced digital processing of remote-sensing images
- Radiometric correction.
- Generation of artificial bands.
- Enhancement of satellite imagery: spatial filters.
- Spectral signatures.
- Image fusion techniques.

Topic 4.3 Digital image classification and multi-temporal analysis
- Digital image classification: basic concepts, methods and applications.
- The supervised and unsupervised methods: theoretical principles, training techniques, mapping methods and verification process.
- Change detection techniques.

Topic 4.4 Radar image interpretation
- Principles of remote sensing radar
- Platforms, sensors and image types.
- Radiometric calibration and elimination of the speckle
- Geometric correction methods and interferometry.

- Practice: applying techniques of visualization, calibration, speckle removal, geometric correction and interferometry on radar images.

Topic 4.5 Interpretation of hyperspectral image
- Conceptual issues of hyperspectral images.
- Hyperspectral sensors.
- Hyperspectral images processing

Topic 4.6 Interpretation of the LiDAR images
- Introduction to LiDAR technology
- Visualization and processing of the point-cloud.
- LIDAR images applications

4.4. Course planning and calendar

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

4.5. Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/eBuscar.php?tipo=a