60403 - Analysing Geographical Information: Teledetection

Información del Plan Docente

Academic Year	2018/19
Subject	60403 - Analysing Geographical Information: Teledetection
Faculty / School	103 - Facultad de Filosofía y Letras
Degree	352 - Master's in Geographical Information Technology for Territorial Development: Geographical Informations Systems and Teledetection
ECTS	12.5
Year	1
Semester	Annual
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 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:

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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

- Campbell, James B.. Introduction to remote sensing / James B. Campbell . 3rd ed London [etc.] : Taylor & Francis, 2002
- Chuvieco Salinero, Emilio. Teledetección ambiental : la observación de la Tierra desde el espacio / Emilio Chuvieco . 1ª ed. act. Barcelona : Ariel, 2010
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en zonas arbustivas de montaña mediante datos LIDAR. Tesis Doctoral dirigida por L. A. Ruiz València : Universitat Politècnica de València, Departamento de Ingeniería Cartográfica, Geodesia y Fotogrametría
- Manual of remote sensing. Vol. 2, Principles and applications of imaging radar / edited by Floyd M. Henderson and Anthony J. Lewis . 3rd ed. New York : John Wiley & Sons ; published in cooperation with the American Society for Photogrammetry and Remote Sensing, cop. 1998
- Chavez, P. S.. ?Image-based atmospheric corrections : Revisited and improved?. Photogrammetric Engineering and Remote Sensing, vol. 62 (9), pp. 1025-1036
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- García, D.. Lidar : aplicación práctica al inventario forestal : la tecnología al servicio del monte / D. García, M. Godino, F. Mauro Lexington : Editorial Académica Española, 2012
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- Heritage, G.. Laser Scanning for the Environmental Sciences / G. Heritage & A. Large Chichester : John Wiley & Sons, 2009
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- Renslow, M. S.. Manual of airborne topographic lidar / M. S. Renslow Maryland : APSRS, 2012
- Sithole, G.. ?Experimental comparision of filter algorithms for bare-Earth extraction from airborne laser scanning point clouds?, Journal of Photogrammetry and Remote Sensing, vol. 59 (1), pp. 85-101
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