

## 60403 - Analysing Geographical Information: Teledetection

### Información del Plan Docente

<b>Academic Year</b>	2016/17
<b>Academic center</b>	103 - Facultad de Filosofía y Letras
<b>Degree</b>	352 - Master's in Geographical Information Technology for Territorial Development: Geographical Informations Systems and Teledetection
<b>ECTS</b>	12.5
<b>Course</b>	1
<b>Period</b>	Annual
<b>Subject Type</b>	Compulsory
<b>Module</b>	---

### **1.Basic info**

#### **1.1.Recommendations to take this course**

#### **1.2.Activities and key dates for the course**

### **2.Initiation**

#### **2.1.Learning outcomes that define the subject**

#### **2.2.Introduction**

### **3.Context and competences**

#### **3.1.Goals**

#### **3.2.Context and meaning of the subject in the degree**

#### **3.3.Competences**

#### **3.4.Importance of learning outcomes**

### **4.Evaluation**

### **5.Activities and resources**

#### **5.1.General methodological presentation**

The learning and teaching methodology developed in the course is aimed to promote the attainment of its objectives. A wide range of teaching and learning activities is implemented, such as interactive lessons, practical exercises, individual or group activities, directed activities and private study.

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

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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

### 5.2.Learning activities

#### 4.1.- Visual analysis of remote sensing images

- Lecture sessions: 7.5 hours
- Interactive, individual or group activities : 7.5 hours
- Private study: 19 hours
- Directed activities: 50 minutes per student

#### 4.2 Advanced digital processing of remote-sensing images

- Lecture sessions: 15 hours
- Interactive, individual or group activities: 22.5 hours
- Private study: 37 hours
- Directed activities: 50 minutes per student
- Assessment: 75 minutes

#### 4.3 Digital image classification and multi-temporal analysis

- Lecture sessions: 7.5 hours
- Interactive, individual or group activities: 7.5 hours
- Field work: 17.5 hours
- Private study: 29 hours
- Directed activities: 50 minutes per student

#### 4.4 Radar image interpretation

- Lecture sessions: 15 hours
- Interactive, individual or group activities: 22.5 hours
- Private study: 37 hours
- Directed activities: 85 minutes per student
- Assessment: 50 minutes

#### 4.5 Interpretation of hyperspectral image

- Lecture sessions: 7.5 hours
- Interactive, individual or group activities: 7.5 hours
- Private study: 17 hours
- Directed activities: 50 minutes per student
- Assessment: 75 minutes

#### 4.6 Interpretation of the LiDAR images

- Lecture sessions: 6 hours
- Interactive, individual or group activities: 9 hours
- Private study: 10 hours
- Directed activities: 50 minutes per student
- Assessment: 50 minutes

### 5.3.Program

#### 4.1.- Visual analysis of remote sensing images

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- 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.

### 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.

### 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.

### 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 removing, geometric correction and interferometry on radar images.

### 4.5 Interpretation of hyperspectral image

- Conceptual issues of hyperspectral images.
- Hyperspectral sensors.
- Hyperspectral images processing

### 4.6 Interpretation of the LiDAR images

- Introduction to LiDAR technology
- Visualization and processing of the point-cloud.
- LiDAR images applications

## 5.4.Planning and scheduling

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>)

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### 5.5. Bibliography and recommended resources

Campbell, James B.. Introduction to remote sensing / James B. Campbell . 3rd ed London [etc.] : Taylor & Francis, 2002

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- Estornell, J. . Análisis de los factores que influyen en la precisión de un MDE y estimación de parámetros forestales 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
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- Vosselman, G.. Airborne and Terrestrial Laser Scanning / G. Vosselman, H. G. Maas Dunbeath : Whittles Publishing, 2010