

**1. General information****Course:** PHOTOINTERPRETATION AND REMOTE SENSING**Code:** 66427**Type:** CORE COURSE**ECTS credits:** 6**Degree:** 404 - UNDERGRADUATE DEGREE GEOGRAPHY, TERRITORIAL DEVELOPMENT AND SUSTAINABILITY**Academic year:** 2023-24**Center:** 2 - FACULTY OF LETTERS**Group(s):** 28 23**Year:** 2**Duration:** C2**Main language:** Spanish**Second language:****Use of additional languages:****English Friendly:** Y**Web site:****Bilingual:** N**Lecturer:** RAFAEL UBALDO GOSALVEZ REY - Group(s): 23 28

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2. Pre-Requisites

It would be convenient to have knowledge or to have previously studied subjects related to Physical and Human Geography, Cartography and GIS.

3. Justification in the curriculum, relation to other subjects and to the profession

The course develops the contents of the subject GEOGRAPHIC LANGUAGES AND TECHNIQUES of the module GEOGRAPHIC TECHNOLOGIES AND KNOWLEDGE SOCIETY of the Degree in GEOGRAPHY, TERRITORIAL DEVELOPMENT AND SUSTAINABILITY and develops contents of the knowledge areas of PHYSICAL GEOGRAPHY, REGIONAL GEOGRAPHIC ANALYSIS and HUMAN GEOGRAPHY. It has a professional character. For the detailed relation with other subjects of the present degree and the professional activity we refer to the corresponding Memory of the Degree.

4. Degree competences achieved in this course**Course competences**

Code	Description
CB03	Be able to gather and process relevant information (usually within their subject area) to give opinions, including reflections on relevant social, scientific or ethical issues.
CE04	Integrate knowledge from various social and environmental disciplines in order to describe and interpret the spatial dynamics linked to regional transformations.
CE08	To apply the methods and techniques of geographical analysis especially oriented to the design and management of the instruments of territorial development and protection of the natural and cultural heritage.
CT02	Know and apply the Information and Communication Technologies.

5. Objectives or Learning Outcomes**Course learning outcomes****Description**

Know how to interpret the territory using satellite and aerial photography images
Elaborate photo interpretation schemes with a clear and neat presentation
Know the spatial processes by comparing images of different times or moments
Answer to location questions, differentiation and relation typical of geographical analysis, spatial development and sustainability, by using GIT
Know how to obtain, select and record photographic information and satellite information from internet and documentation centres
Using software tools of treatment and information management

6. Units / Contents**Unit 1: INTRODUCTION TO REMOTE SENSING****Unit 1.1** Concept and elements of the remote sensing process**Unit 1.2** History**Unit 1.3** Funds and availabilities**Unit 2: PHYSICAL PRINCIPLES OF REMOTE SENSING****Unit 2.1** Electromagnetic spectrum. Types, physical laws and units of measurement**Unit 2.2** Interactions with the atmosphere. Composition, disturbances and atmospheric windows**Unit 2.3** Interactions with the Earth's surface: Albedo and spectral signature**Unit 3: SENSORS, PLATFORMS AND DATA ACQUISITION SYSTEMS****Unit 3.1** Sensors. Definition and types.**Unit 3.2** Resolution of a sensor.**Unit 3.3** Spaceborne and airborne platforms**Unit 4: BASIS FOR IMAGE INTERPRETATION: DIGITAL ANALYSIS**

Unit 4.1 QGIS and Remote Sensing. Visualization of images.

Unit 4.2 Geometric and radiometric corrections

Unit 4.3

Unit 5: BASIS FOR THE INTERPRETATION OF IMAGES. VISUAL ANALYSIS

Unit 5.1 Fundamentals. Types of stereoscopes. The pair and the stereoscopic triplet

Unit 5.2 Elements and criteria in visual analysis.

Unit 5.3 Practical applications of photointerpretation in Geography

Unit 6: INTRODUCTION TO REMOTELY PILOTED AIRCRAFT SYSTEM (RPA)

Unit 6.1 Introduction to RPAS. Aeronautical regulations

Unit 6.2 Flight systems: aircraft knowledge and operational procedures

Unit 6.3 Practical applications of RPAS in Geography

7. Activities, Units/Modules and Methodology							
Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	Description
Class Attendance (theory) [ON-SITE]	Lectures	CB03 CE04 CE08 CT02	1.2	30	Y	N	
Class Attendance (practical) [ON-SITE]	Practical or hands-on activities	CB03 CE04 CE08 CT02	1.2	30	Y	N	
Practicum and practical activities report writing or preparation [OFF-SITE]	Practical or hands-on activities	CB03 CE04 CE08 CT02	2.4	60	Y	Y	
Writing of reports or projects [OFF-SITE]	Group Work	CB03 CE04 CE08 CT02	1.2	30	Y	Y	
Total:			6	150			
Total credits of in-class work: 2.4				Total class time hours: 60			
Total credits of out of class work: 3.6				Total hours of out of class work: 90			

As: Assessable training activity

Com: Training activity of compulsory overcoming (It will be essential to overcome both continuous and non-continuous assessment).

8. Evaluation criteria and Grading System			
Evaluation System	Continuous assessment	Non-continuous evaluation*	Description
Theoretical papers assessment	15.00%	25.00%	Students will have to work out the first three topics of the course in working groups, which also aims to assess their ability to work in a group. The result will be two products: a 15-page topic and its oral defence in public. Both products will be evaluated by the teacher taking into account the originality, the formal oral and written presentation, the theoretical contents and the use of the bibliography and documentation used. The rest of the students will be obliged to participate in the evaluation of the oral presentation.
Assessment of activities done in the computer labs	20.00%	25.00%	The objective is to provide the student with different skills and competences through several practical exercises delivered weekly. These practices, together with the teamwork and the class notes will be gathered in a Portfolio that will be given by the student to the teacher at the end of the course.
Oral presentations assessment	15.00%	20.00%	
Practicum and practical activities reports assessment	25.00%	30.00%	
Self Evaluation and Co-evaluation	10.00%	0.00%	
Assessment of active participation	15.00%	0.00%	
Total:	100.00%	100.00%	

According to art. 4 of the UCLM Student Evaluation Regulations, it must be provided to students who cannot regularly attend face-to-face training activities the passing of the subject, having the right (art. 12.2) to be globally graded, in 2 annual calls per subject, an ordinary and an extraordinary one (evaluating 100% of the competences).

Evaluation criteria for the final exam:

Continuous assessment:

Projects: formal presentation, treatment of theoretical content, originality, use of bibliography, oral defence, degree of autonomy and attitude towards work will be valued.

Practices to be included in the portfolio: the organization and cleanliness of each practice, the application of the theoretical contents, the degree of autonomy and the attitude of the student and the fulfilment of the delivery date will be evaluated.

Portfolio: the following criteria will be taken into account: order and coherence of the contents, creative presentation, existence of a cover and index, inclusion of the teaching guide and the materials provided by the teacher, inclusion of the group work, inclusion of all the practices

Non-continuous evaluation:

Given the characteristics of the proposed assessment system, no adaptation is required for those students who cannot regularly attend class or in the event of a new confinement due to a new COVID19 alarm condition. In these cases, tutorials through MSTEams and teacher guidance through Virtual Campus provide sufficient elements to obtain the maximum benefit of the subject by the student.

9. Assignments, course calendar and important dates

Not related to the syllabus/contents

Hours	hours
Unit 1 (de 6): INTRODUCTION TO REMOTE SENSING	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	2
Writing of reports or projects [AUTÓNOMA][Group Work]	15
Teaching period: 1 week	
Group 22:	
Initial date: 31-01-2024	End date: 01-02-2024
Group 23:	
Initial date: 31-01-2024	End date: 01-02-2024
Group 28:	
Initial date: 31-01-2024	End date: 01-02-2024
Unit 2 (de 6): PHYSICAL PRINCIPLES OF REMOTE SENSING	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	2
Writing of reports or projects [AUTÓNOMA][Group Work]	15
Teaching period: 1 week	
Group 28:	
Initial date: 07-02-2024	End date: 08-02-2024
Group 22:	
Initial date: 07-02-2024	End date: 08-02-2024
Group 23:	
Initial date: 07-02-2024	End date: 08-02-2024
Unit 3 (de 6): SENSORS, PLATFORMS AND DATA ACQUISITION SYSTEMS	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	2
Writing of reports or projects [AUTÓNOMA][Group Work]	15
Teaching period: 1 week	
Group 28:	
Initial date: 14-02-2024	End date: 15-02-2024
Group 22:	
Initial date: 14-02-2024	End date: 15-02-2024
Group 23:	
Initial date: 14-02-2024	End date: 15-02-2024
Unit 4 (de 6): BASIS FOR IMAGE INTERPRETATION: DIGITAL ANALYSIS	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	8
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	8
Practicum and practical activities report writing or preparation [AUTÓNOMA][Practical or hands-on activities]	14
Writing of reports or projects [AUTÓNOMA][Group Work]	7
Teaching period: 4 weeks	
Group 28:	
Initial date: 21-02-2024	End date: 14-03-2024
Group 22:	
Initial date: 21-02-2024	End date: 14-03-2024
Group 23:	
Initial date: 21-02-2024	End date: 14-03-2024
Unit 5 (de 6): BASIS FOR THE INTERPRETATION OF IMAGES. VISUAL ANALYSIS	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	10
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	10
Practicum and practical activities report writing or preparation [AUTÓNOMA][Practical or hands-on activities]	16
Writing of reports or projects [AUTÓNOMA][Group Work]	8
Teaching period: 6 weeks	
Group 28:	
Initial date: 21-03-2024	End date: 25-04-2024
Group 22:	
Initial date: 21-03-2024	End date: 25-04-2024
Group 23:	
Initial date: 21-03-2024	End date: 25-04-2024
Unit 6 (de 6): INTRODUCTION TO REMOTELY PILOTED AIRCRAFT SYSTEM (RPA)	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	6
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	6
Teaching period: 3 weeks	
Group 22:	
Initial date: 02-05-2024	End date: 09-05-2024
Group 23:	

Initial date: 02-05-2024	End date: 09-05-2024
Group 28:	
Initial date: 02-05-2024	End date: 09-05-2024
Global activity	
Activities	hours
Practicum and practical activities report writing or preparation [AUTÓNOMA][Practical or hands-on activities]	30
Class Attendance (theory) [PRESENCIAL][Lectures]	30
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	30
Writing of reports or projects [AUTÓNOMA][Group Work]	60
Total horas: 150	

10. Bibliography and Sources						
Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
GOOGLE INC.	Google Earth https://www.google.es/intl/es_es/earth/	Google Inc.	EE.UU.		2022	
LILLESAND, T.; HIEFER, R.W. y CHIPMAN, J.	Remote sensing and image interpretation https://www.wiley.com/en-gb/Remote+Sensing+and+Image+Interpretation%2C+7th+Edition-p-9781118343289	Wiley	USA	978-1-118-34328-9	2015	
ESTEBAN HERREROS, J.L. (coord.)	Los Drones y sus Aplicaciones a la Ingeniería Civil https://www.fenercom.com/wp-content/uploads/2015/03/Los-Drones-y-sus-Aplicaciones-a-la-Ingenieria-Civil-fenercom-2015.pdf	FENERCOM- Comunidad de Madrid	Madrid		2015	
VIRUES ORTEGA, D. y GARCÍA-CABAÑAS BUENO, J.A.	Piloto de dron (RPAS)	Ediciones Paraninfo, S.A.		8428338736	2016	
FERNÁNDEZ GARCÍA, F.	Introducción a la fotointerpretación	Ariel Geografía	Barcelona		2000	
IGN	IBERPIX. Visualizador cartográfico y de imágenes. https://www.ign.es/iberpix/visor/	CNIG	Madrid		2022	
SOBRINO, J.A.	Teledetección	Servicio de Publicaciones de la Universidad de Valencia.	Valencia		2000	
SANDOVAL RAMÓN, L	Geomorfología	Ministerio de Defensa Publicaciones Científicas del Centro de	Madrid		1991	
LÓPEZ VERGARA, M ^a . L.	Manual de fotogeología	Investigaciones Energéticas, Medioambientales y Tecnológicas	Madrid		1988	
CHUVIECO, E.	Fundamentals of Satellite Remote Sensing. An Environmental Approach	CRC Press (Taylor & Francis Group)	Flodira (USA)	978-1-138-58383-2	2020	
THENKABAIL, P.S., LYON, J.G. & HUETE, A.	Hyperspectral Remote Sensing of Vegetation. Volumen I, Fundamentals, Sensor Systems, Spectral Libraries, and Data Mining for Vegetation	CRC Press Taylor and Francis		978-1-138-05854-5	2019	
PAINE, D.P. & KISER, J.D.	Aerial Photography and Image Interpretation, Third Edition https://onlinelibrary.wiley.com/doi/book/10.1002/9781118110997	John Wiley & Sons, Inc.			2012	
TAROLLI, P. & MUDD, S.M.	Remote sensing of Geomorphology https://www.google.es/books/edition/Remote_Sensing_of_Geomorphology/rWLdDwAAQBAJ?hl=es&gbpv=1	Elsevier	Oxford & Cambridge	978-0-444-64177-9	2020	
PARCAK, S.H.	Satellite remote sensing for archaeology	Routledge	London & New York	978-0-415-44878-9	2009	