

**1. General information****Course:** PROJECT WORK: TOOLS FOR LAND USE ANALYSIS AND MANA**Code:** 38320**Type:** CORE COURSE**ECTS credits:** 6**Degree:** 345 - UNDERGRADUATE DEGREE PROGRAMME IN CIVIL ENGINEERING**Academic year:** 2023-24**Center:** 603 - E.T.S. CIVIL ENGINEERS OF CR**Group(s):** 20**Year:** 3**Duration:** First semester**Main language:** Spanish**Second language:** English**Use of additional languages:****English Friendly:** Y**Web site:****Bilingual:** N**Lecturer:** JOSE SALOMON MONTESINOS ARANDA - Group(s): 20

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2. Pre-Requisites

Basic knowledge on Topography, Cartography, Geodesy and Geometry learned of *Civil Drawing* and *Topography* courses in the first year and *PBL: Graphic-Cartographic information* of the second year of Civil Engineering.

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

The planning, analysis and evaluation of the territory requires geographic tools which help you to manage the geo-referenced information. The subject, eminently practical, develops not only fundamental concepts of Earth Information Science, Remote Sensing and GIS, but also Land Management practices in Hydrology, Land planning, Acoustic Environment and Urban Planning

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

Code	Description
CB05	Have developed the necessary learning abilities to carry on studying autonomously
CE01	Students can apply their knowledge in the practical solution of civil engineering problems, with capacity for the analysis and definition of the problem, the proposal of alternatives and their critical evaluation, choosing the optimal solution with technical arguments and with capacity of defense against third parties.
CE02	Students have the ability to broaden their knowledge and solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study. Self-study ability, to undertake further studies with a high degree of autonomy
CE06	Students have a basic knowledge of the use and programming of computers, operating systems, databases and software with engineering application.
CG01	Students achieve general knowledge of Information and Communication Technologies (ICT).
CG02	Students can use proper oral and written communication
CG04	Students have management and teamwork skills

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

Ability to model geographic reality with new data capture techniques, for both its graphical representation and its analysis.

Students know the necessary tools for the quality control of the starting data and the results obtained.

Students can manage georeferenced information to help them make decisions in different areas: planning and management of natural resources, transport, hydrology, conservation and management of infrastructure, land use planning.

6. Units / Contents**Unit 1: Theoretical principles****Unit 1.1** Geodesy and Mathematical Cartography**Unit 1.2** The new geodesic network**Unit 1.3** Platforms and sensors**Unit 1.4** Remote Sensing**Unit 2: Data source****Unit 2.1** Graphic documentation

Unit 2.2 Images processing: corrections

Unit 2.3 Database: orthophotos, images and relational data

Unit 2.4 Quality control

Unit 3: Geographic Information System

Unit 3.1 Theoretical principles

Unit 3.2 Spatial Analysis and Data Management

Unit 3.3 Learning Open Software

Unit 3.4 Applications: a case study

7. Activities, Units/Modules and Methodology

Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	Description
Computer room practice [ON-SITE]	Problem solving and exercises	CE06 CG01	0.6	15	Y	N	Management Open GIS Software. The student will solve some exercise to learn the specific commands of the different computer programs.
Practicum and practical activities report writing or preparation [OFF-SITE]	Self-study	CB05 CE01 CE02 CE06 CG02 CG04	0.3	7.5	Y	Y	Writing a document with exercises resolutions using different software programmes
Writing of reports or projects [OFF-SITE]	Project/Problem Based Learning (PBL)	CB05 CE01 CE02 CG01 CG02 CG04	2.6	65	Y	Y	Students in groups of 3 or 4 will develop a project work on territorial, environmental or hydrological planning or management. Related to these topics, students will prepare an English presentation of a GIS application developed anywhere in the world.
Group tutoring sessions [ON-SITE]	Group Work	CE01 CE02 CG02	0.6	15	Y	N	Students in compulsory group tutorials will work on the chosen planning or management project and will solve any doubts during the course of the project with the help of the teacher.
Workshops or seminars [ON-SITE]	Guided or supervised work	CB05 CE02 CG02	0.6	15	Y	N	Specific workshops or seminars will be scheduled, given by the teacher or a lecturer, to help them in their work.
Final test [ON-SITE]	Assessment tests	CE01 CG01 CG02 CG04	0.06	1.5	Y	Y	The student will take an exam of theoretical concepts. In addition, the student must present, together with his or her group colleagues, the management or planning project.
Study and Exam Preparation [OFF-SITE]	Self-study	CE01 CE02 CG01 CG02	0.4	10	N	-	Study and prepare the oral presentation of their work.
Class Attendance (theory) [ON-SITE]	Lectures		0.48	12	N	-	Theoretical classes. Explanation of concepts
Mid-term test [ON-SITE]	Assessment tests		0.06	1.5	Y	Y	Around the month of November, students will take a GIS concepts theoretical and a practical exam. The student MUST PASS EACH PART (minimum 4 over 10) INDEPENDENTLY FOR THE MIDDLE TO BE DONE with the Remote Sensing theoretical exam.
Off-site theoretical learning [OFF-SITE]	Self-study		0.3	7.5	N	-	The students will autonomously watch conceptual videos made by the teacher and then in class they will solve the doubts.
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
Final test	25.00%	25.00%	Review of basic concepts
Theoretical papers assessment	25.00%	25.00%	Each group of students will make a written report of the project work they have developed in the course. The grade in the report will be 25% of the final grade.
Practicum and practical activities reports assessment	25.00%	25.00%	Each student will have to present his/her report of the practices with computer.

Oral presentations assessment	20.00%	25.00%	The score of the oral presentation of the students' work will assess their oral expression and defense of the work (face-to-face) and the audiovisual media they have used to support their explanation
Assessment of active participation	5.00%	0.00%	The participation of the student in class will be valued, as much in his or her exhibitions as in that of his or her classmates, as well as his or her attitude in all the classroom activities of the subject. It cannot be retaken.
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:

Unless stated otherwise, continuous evaluation criteria will be applied to all students.

Anyone choosing non-continuous assessment must notify it to the lecturer within the class period of the subject. The option is only available if the student's participation in evaluation activities (from the continuous assessment) has not reached 50% of the total evaluation for the subject.

For the retake exam, the assessment type used for the final exam will remain valid.

To pass the subject, the following requirements must be fulfilled:

a) 25% exam grade + 25% group work grade + 25% internship grade +20% oral presentation of group work + 5% attendance at class with success.

b) The student MUST PASS EACH PART (minimum 4 over 10) INDEPENDENTLY FOR THE MIDDLE TO BE DONE.

c) In the event of having any failed part, the ORDINARY assesment call will be presented exclusively to the party or parties that have failed. If the student does not pass in this call, he or she will go to the extraordinary call.

The score does not carry over from one year to the next. The rules of the written documents will be indicated in the Virtual Campus

Non-continuous evaluation:

The student who follows the subject in non-continuous evaluation will present a report of a work proposed by the teacher (25%), a oral presentation of this report (25%) on the day of the ordinary call, a compilation of practical cases prepared with the software taught in the subject (25%) and a comprehensive examination of concepts(25%)

The score does not carry over from one year to the next. The rules of the written documents will be indicated in the Virtual Campus

Specifications for the resit/retake exam:

In the Extraordinary call, the student will recover those failed blocks of which the evaluation consists. The average grade will be calculated according to the percentages indicated in the continuous or non-continuous evaluation system followed by the student. The student MUST PASS EACH PART INDEPENDENTLY TO GET THE AVERAGE (minimum 4 out of 10).

The score does not carry over from one year to the next. The rules of the written documents will be indicated in the Virtual Campus

Specifications for the second resit / retake exam:

Final exam of theoretical _practical_ knowledge (25%) + report proposed by the teacher (25%) + oral presentation and defense (25%)+compilation of practical cases (25%).

9. Assignments, course calendar and important dates	
Not related to the syllabus/contents	
Hours	hours
Unit 1 (de 3): Theoretical principles	
Activities	Hours
Final test [PRESENCIAL][Assessment tests]	1
Study and Exam Preparation [AUTÓNOMA][Self-study]	6
Class Attendance (theory) [PRESENCIAL][Lectures]	3
Unit 2 (de 3): Data source	
Activities	Hours
Computer room practice [PRESENCIAL][Problem solving and exercises]	5
Practicum and practical activities report writing or preparation [AUTÓNOMA][Self-study]	3
Final test [PRESENCIAL][Assessment tests]	1
Study and Exam Preparation [AUTÓNOMA][Self-study]	2
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Unit 3 (de 3): Geographic Information System	
Activities	Hours
Computer room practice [PRESENCIAL][Problem solving and exercises]	10
Practicum and practical activities report writing or preparation [AUTÓNOMA][Self-study]	12
Writing of reports or projects [AUTÓNOMA][Project/Problem Based Learning (PBL)]	65
Group tutoring sessions [PRESENCIAL][Group Work]	15
Workshops or seminars [PRESENCIAL][Guided or supervised work]	15
Final test [PRESENCIAL][Assessment tests]	1
Study and Exam Preparation [AUTÓNOMA][Self-study]	2
Class Attendance (theory) [PRESENCIAL][Lectures]	5
Global activity	
Activities	hours
Practicum and practical activities report writing or preparation [AUTÓNOMA][Self-study]	15
Final test [PRESENCIAL][Assessment tests]	3
Study and Exam Preparation [AUTÓNOMA][Self-study]	10
Computer room practice [PRESENCIAL][Problem solving and exercises]	15
Workshops or seminars [PRESENCIAL][Guided or supervised work]	15
Group tutoring sessions [PRESENCIAL][Group Work]	15

Writing of reports or projects [AUTÓNOMA][Project/Problem Based Learning (PBL)]	65
Class Attendance (theory) [PRESENCIAL][Lectures]	12
Total horas:	150

10. Bibliography and Sources						
Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Bosque Sendra, Joaquín	Sistemas de información geográfica	Rialp		84-321-3154-7	1997	
Burrough, P. A.	Principles of geographical information systems for land reso	Clarendon Press		0-19-854592-4 (pbk)	1996	
Burrough, Peter A.	Principles of geographical information system	Oxford University Press		0-19-823365-5 (Pbk)	1997	
Congreso de Métodos Cuantitativos, SIG y Teledetección11ªMur	El empleo de los SIG y la teledetección en planificación ter	Universidad de Murcia, Departamento de GeografíaAs		84-8371-486-8	2004	
Gutiérrez Puebla, Javier	SIG: Sistemas de Información Geográfica	Síntesis		84-7738-246-8	2008	
Moreno Jiménez, Antonio	SIG: Aplicaciones en Diagnósticos Territoriales y Decisiones Geoambientales	RA-MA		978-84-9964-131-7	2012	
Otero Pastor, Isabel	Paisaje, teledetección y SIG: concepto y aplicaciones	Fundación Conde del Valle de Salazar		84-86793-50-5	1999	
Zurita Espinosa, Laureano	La gestión del conocimiento territorial	RA-MA		978-84-9964-095-2	2011	