



1. General information

Course: WATER RESOURCES SYSTEM MANAGEMENT

Type: CORE COURSE

Degree: 2343 - MASTERS DEGREE PROGRAMME IN ENGINEERING OF ROADS, CANALS AND PORTS

Center: 603 - E.T.S. CIVIL ENGINEERS OF CR

Year: 1

Main language: English

Use of additional languages:

Web site:

Code: 310808

ECTS credits: 4.5

Academic year: 2022-23

Group(s): 20

Duration: C2

Second language: English

English Friendly: N

Bilingual: N

Lecturer: JAVIER GONZALEZ PEREZ - Group(s): 20				
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Lecturer: SAMUEL MORALEDA LUDENA - Group(s): 20				
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2. Pre-Requisites

Numerical Analysis

Hydrologic Engineering

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

The student will reach the knowledge and skills for the management of water resources, the related Spanish and European legislation, the modeling and simulation techniques of systems, and the tools for optimization and support for decision making that can be used.

4. Degree competences achieved in this course

Course competences	
Code	Description
G01	Scientific-technical and methodological capacity for the continuous recycling of knowledge and the exercise of the professional functions of consultancy, analysis, design, calculation, project, planning, leadership, management, construction, maintenance, conservation and exploitation in the fields of civil engineering.
G03	Knowledge, understanding and ability to apply the necessary legislation in the exercise of the profession of Civil Engineer.
G09	Capacity to plan and manage water and energy resources, including the management of the integrated water cycle.
G27	Ability to communicate in a second language.
TE05	Ability to calculate, evaluate, plan and regulate surface and groundwater resources.

5. Objectives or Learning Outcomes

Course learning outcomes	
Description	
Students are familiar with the usual orders of magnitude, sources of information and scales of work in water resources planning and management.	
Students can numerically analyze the behavior of these systems and the implementation of optimization techniques as decision support tools.	
Students can model a water resources system, in its surface and underground components, with the purpose of its use for a set of demands and restrictions, seeking their fulfillment in a sustainable way with the preservation of good environmental conditions.	
Students know the regulatory framework and technical recommendations, both national and international.	
Students know the environmental implications of water resources development.	

6. Units / Contents

Unit 1: Legislation framework
Unit 2: Hydrologic Scenarios
Unit 3: Water Resources Management
Unit 4: Decision Support Techniques
Unit 5: Hydrologic extremes: Flood and Droughts

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	G01 G03 G09 G27 TE05	0.8	20	N	-	
Project or Topic Presentations [ON-SITE]	project-based learning	G01 G03 G09 G27 TE05	0.24	6	Y	Y	
Workshops or seminars [ON-SITE]	project-based learning	G01 G03 G09 G27 TE05	0.31	7.75	Y	N	Class participation is evaluated.
Study and Exam Preparation [OFF-SITE]	Self-study	G01 G03 G09 G27 TE05	1.12	28	N	-	
Writing of reports or projects [OFF-SITE]	project-based learning	G01 G03 G09 G27 TE05	2.03	50.75	Y	Y	
Final test [ON-SITE]	Assessment tests		0	0	Y	Y	
Total:			4.5	112.5			
Total credits of in-class work: 1.35			Total class time hours: 33.75				
Total credits of out of class work: 3.15			Total hours of out of class work: 78.75				

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
Assessment of active participation	10.00%	0.00%	No retaken. Specific score keeps between different academic years.
Final test	40.00%	40.00%	Written exam. Specific score does not keep between different academic years.
Theoretical papers assessment	40.00%	40.00%	Homeworks. Specific score keeps between different academic years.
Oral presentations assessment	10.00%	10.00%	Homework oral presentations. Specific score keeps between different academic years.
Oral presentations assessment	0.00%	10.00%	Oral presentation of a scientific paper related with the subject. Specific score keeps between different academic years.
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:

Exam score must achieve at least 4 points over 10.
Global Project and Home Works Scores must must achieve at least 4 points over 10.
Global Project and Home Works oral presentations must achieve at least 4 points over 10.

Non-continuous evaluation:

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.

Exam score must achieve at least 4 points over 10.
Global Project and Home Works Scores must must achieve at least 4 points over 10.
Global Project and Home Works oral presentations must achieve at least 4 points over 10.
Oral presentation of a scientific paper must achieve at least 4 points over 10.

Specifications for the resit/retake exam:

Project and Home Works Scores keep in the extraordinary call.

Specifications for the second resit / retake exam:

Similar conditions to non-continuous evaluation.

9. Assignments, course calendar and important dates	
Not related to the syllabus/contents	
Hours	hours
Unit 1 (de 5): Legislation framework	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	12
Study and Exam Preparation [AUTÓNOMA][Self-study]	24
Unit 2 (de 5): Hydrologic Scenarios	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Writing of reports or projects [AUTÓNOMA][project-based learning]	15
Unit 3 (de 5): Water Resources Management	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Writing of reports or projects [AUTÓNOMA][project-based learning]	15
Unit 4 (de 5): Decision Support Techniques	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Project or Topic Presentations [PRESENCIAL][project-based learning]	3
Workshops or seminars [PRESENCIAL][project-based learning]	2.75
Writing of reports or projects [AUTÓNOMA][project-based learning]	24.75
Unit 5 (de 5): Hydrologic extremes: Flood and Droughts	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Global activity	
Activities	hours
Workshops or seminars [PRESENCIAL][project-based learning]	2.75
Project or Topic Presentations [PRESENCIAL][project-based learning]	3
Study and Exam Preparation [AUTÓNOMA][Self-study]	24
Writing of reports or projects [AUTÓNOMA][project-based learning]	54.75
Class Attendance (theory) [PRESENCIAL][Lectures]	28
Total horas: 112.5	

10. Bibliography and Sources						
Author(s)	Title/Link	Publishing house	City	ISBN	Year	Description
Balairón Pérez, Luis	Gestión de recursos hídricos /	Edicions UPC,		84-8301-403-3	2000	
Marsily, Ghislain de	Quantitative hydrogeology: groundwater hydrology for engineer	Academic Press		0-12-208915-4	1986	
	La planificación hidrológica nacional y el déficit hídrico d	Real Academia de Legislación y Jurisprudencia		84-95549-07-7	2001	
	Review of world water resources by country	Food and Agriculture Organization of the United Na		92-5-104899-1	2003	
	Towards efficient use of water resources in Europe	Office for Official Publications of the European U		1725-9177	2012	