

**1. General information****Course:** HYDROGEOGRAPHY AND SOIL GEOGRAPHY**Code:** 66424**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):** 23 28**Year:** 3**Duration:** C2**Main language:** Spanish**Second language:** English**Use of additional languages:** English/Spanish for bibliographic consultation or other web resources.**English Friendly:** Y**Web site:** <https://blog.uclm.es/rafaelbecerra/>**Bilingual:** N**Lecturer:** RAFAEL BECERRA RAMIREZ - Group(s): 23 28

Building/Office	Department	Phone number	Email	Office hours
Facultad de Letras / 3.26	GEOGRAFÍA Y ORD. TERRITORIO	6867	rafael.becerra@uclm.es	The tutoring timetable will be indicated at the beginning of the academic year.

**2. Pre-Requisites**

The student must possess the basic knowledge related to the following subjects studied in previous courses: Physical Geography, General and Applied Geomorphology, General and Applied Climatology, Photointerpretation and Remote Sensing, Geographical Analysis Techniques, Geographical Information Technologies.

An essential requirement will be the use and management of computer tools, either for Internet access for certain searches or queries, and for carrying out practices or exhibitions in class. As well as the management, understanding and realization of cartography, and the different statistics that are used in the preparation of the classes and/or practical works/projects proposed by the professor.

It is recommended (not mandatory) for the student to have knowledge of languages, preferably Spanish, to consult bibliographic material, read any text written in said language or to consult different websites related to the class subject on the Internet and carrying out practical work.

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

Hydrogeography is a **compulsory** subject within the degree of **Geography, Territorial Development and Sustainability**, of **6 credits** and semester nature, which is taught in the second semester of the 3rd year. It belongs to the **matter of Physical Geography** that provides the concepts, knowledge and study methods for the correct understanding of the structure and dynamics of natural systems and landscapes in the current context of Geography and sustainability.

Geographers as connoisseurs and specialists of the territory, must know how to study and analyze the processes related to water resources in a general way, analyze the hydrological cycle and the capacity of the waters to model the landscape. But also attend and understand the strategic processes that Water raises as an indispensable resource for the Human Being and its economic activity, as well as its sustainable management. In the case of the study of soils, their formation, variety and the problems associated with their erosion, are also essential topics in the knowledge and work of geographers, which are studied in a very general way in this subject.

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

Code	Description
CB02	Apply their knowledge to their job or vocation in a professional manner and show that they have the competences to construct and justify arguments and solve problems within their subject area.
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.
CB05	Have developed the necessary learning abilities to carry on studying autonomously.
CE01	Critically analyze the relationship of society with the territory applying the conceptual and theoretical framework of geography and sustainability.
CE02	Analyse and interpret natural, environmental and landscape elements in a systemic way, understanding their involvement in sustainable territorial development processes.
CG02	Train for the resolution of problems and conflicts in the territorial area, facilitating decision making.
CG03	Apply the analysis, interpretation and integration of phenomena at different scales in relation to territorial development.
CT04	Know the ethical commitment and professional deontology.

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

Develop an ethical commitment to the planet and its environmental sustainability.

Correctly describe the basic concepts of hydrology and soil science

Describe the spatial organization of water and soil structures and processes, as well as their temporal evolution at different scales.

Master the basic concepts, essential bibliography and methods and techniques of Physical Geography.

Identify social and economic problems arising from poor management of water and soil resources.

Initiate field work as a basis for geographical analysis and for territorial development and sustainability.  
Comprehensively analyze the components and dynamics of the Earth System at various scales.

#### Additional outcomes

Delimitate and describe the main parameters of a basin and a hydrographic network.  
Describe correctly the basic concepts of hydrology and edaphology.  
Identify edaphic profiles and know the basic nomenclature of Soil classifications.  
Understand and comment on hydrograms.  
Identify the social and economic problems derived from a bad management of water and soil resources.  
Identify water landscapes and interpret their main environmental values

## 6. Units / Contents

### Unit 1: THE IMPORTANCE OF WATER IN THE WORLD

- Unit 1.1 Water on Earth Planet
- Unit 1.2 The River System and the Hydrological Cycle
- Unit 1.3 The quality of the waters: physical, chemical and biological parameters

### Unit 2: SURFACE HYDROGRAPHY: Runoff, hydrographic basin and river regimes

- Unit 2.1 Runoff and runoff cycle concept
- Unit 2.2 Watersheds and their characterization
- Unit 2.3 The hydrogeographic network
- Unit 2.4 The Hydrogram
- Unit 2.5 Water balance of a basin. Deficit and runoff coefficient
- Unit 2.6 The shaping action of river waters
- Unit 2.7 River regimes

### Unit 3: UNDERGROUND HYDROLOGY: basic notions of hydrogeology, the movement and quality of groundwater

- Unit 3.1 Basic concepts
- Unit 3.2 Types of aquifers
- Unit 3.3 Hydrological parameters
- Unit 3.4 Groundwater quality

### Unit 4: SOIL DEFINITION AND COMPONENTS: Morphology and factors that influence soil formation

- Unit 4.1 Basic concepts
- Unit 4.2 Soil Morphology: The Edafic profile
- Unit 4.3 Soil components
- Unit 4.4 Factors influencing in the soil formation

### Unit 5: SOIL PROPERTIES AND SOIL PROCESSES

- Unit 5.1 Physical properties of the soil
- Unit 5.2 Chemical properties of the soil
- Unit 5.3 Biological properties of the soil
- Unit 5.4 Edaphogenetic processes

### Unit 6: Soil Classifications: Soil Taxonomy and WRBSR (FAO)

#### ADDITIONAL COMMENTS, REMARKS

The final Unit (Unit 6) will be developed from photocopies delivered by the teacher, depending on the timing of the rest of the syllabus, and the field work (practical seminars) provided for in the subject. Therefore, it will be a subject of self-learning by the students, with the support of the professors.

## 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	CB05 CE01 CE02 CG02 CG03 CT04	1.68	42	N		Development of master classes. Their development will depend on the teaching needs of the students, and the number of hours dedicated to them may vary. They will also be complemented by the viewing of documentaries and other documents to be discussed during school hours, and which will be the subject of the preparation of autonomous practice reports.
Workshops or seminars [ON-SITE]	Group Work	CB02 CB03 CB05 CE01 CE02 CG02 CG03 CT04	0.48	12	Y	Y	Practical group work during school hours (depending on the development of the theoretical classes), where guidelines will be given for carrying it out and doubts about hydrogeography and soil analysis will be resolved.
Laboratory practice or sessions [ON-SITE]	Practical or hands-on activities	CB02 CB03 CE01 CE02 CG03 CT04	0.16	4	Y	Y	Laboratory practices will be carried out, complemented by seminars and autonomous field work for sample collection. These practices may be extended to an autonomous activity on the part of the students, with the accompaniment/supervision of the

Practicum and practical activities report writing or preparation [OFF-SITE]	Reading and Analysis of Reviews and Articles	CB02 CB03 CE01 CE02	0.8	20	Y	Y	teacher. Mandatory readings, viewing of documentaries and/or review of articles related to the agenda that is being developed at the moment, or that are current.
Writing of reports or projects [OFF-SITE]	Group Work	CB02 CB03 CB05 CE01 CE02 CG02 CG03 CT04	2.2	55	Y	Y	Autonomous work in assigned groups during the first days of class, in relation to the work developed in the classroom, on hydrogeography and soil analysis, both to be delivered in mid-May. Depending on the economic possibilities to develop this activity, part of the subject will be carried out through Field Work that will complement the scheduled face-to-face training activities (Hydrogeography at the beginning of April; Edaphology at the beginning of May). This autonomous work will be carried out outside school hours and with the accompaniment/supervision of the teacher.
Study and Exam Preparation [OFF-SITE]	Self-study	CB03 CE01 CE02 CG02 CG03	0.6	15	Y	N	Activity that will consist of the preparation of the material collected in the field work (seminars) and/or laboratory, the writing of the obligatory works and/or preparation of the final test.
Final test [ON-SITE]	Self-study	CB02 CB03 CB05 CG02 CG03	0.08	2	Y	Y	Final exam in the month of May/June, date established by the calendar of the Faculty of Letters.
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	40.00%	40.00%	Development of the theoretical and practical contents acquired by the student during the course and evaluated in a final test or Exam, on a date to be determined by the calendar of the Faculty of Letters (May/June).
Practicum and practical activities reports assessment	20.00%	20.00%	Practices carried out in class (tutored activity) and independently by the students. These practices will be part of the portfolio of the Physical Geography Matter of the degree. The guidelines for carrying them out will be given at the beginning of the academic year.
Theoretical papers assessment	40.00%	40.00%	Group work developed by the students, both in the Hydrogeography part and in the Edaphology part. The delivery date of the works will be discussed at the beginning of the four-month period, and the final delivery will foreseeably be established in mid-May for the two compulsory works.
<b>Total:</b>	<b>100.00%</b>	<b>100.00%</b>	

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:

All the activities carried out by the students throughout the course will count towards the final evaluation of the subject, therefore attendance and development of the same is mandatory in order to pass the subject.

In addition, there will be a final test in which the student will demonstrate the knowledge acquired throughout the course, the date and time of which will be established by the academic calendar of the Faculty of Letters.

In the exam, a minimum grade of 4 points (out of 10) must be obtained, in order to make an average grade with the rest of the grades of the subject. If this minimum mark is not reached, the final mark will be that of the exam.

##### Non-continuous evaluation:

The same as for continuous evaluation. You must deliver the works on time and in the proper form, following the indications of the Virtual Campus or in-person classes. If not, all assignments and practices will be delivered as a deadline on the same day of the exam, which will be established by the academic calendar of the Faculty of Letters.

If the student could not carry out the group work, the presentation of an extra work will be considered, to be computed within the "Theoretical Papers assessment".

#### Specifications for the resit/retake exam:

The student must pass a written test related to the contents of the syllabus of the subject, in addition to the delivery of the assignments and / or reports of practices carried out during it, and that had not been delivered on the date. The deadline for delivery of papers and delayed practices will be the same as the extraordinary exam.

**Specifications for the second resit / retake exam:**

They will be established based on the academic conditions of each of the affected students. However, it will be essential that the student has presented, or present on the day of the exam, the practices and / or work proposed the previous academic year, in addition to taking the exam corresponding to this call.

9. Assignments, course calendar and important dates	
Not related to the syllabus/contents	
<b>Hours</b>	<b>hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	1
Study and Exam Preparation [AUTÓNOMA][Self-study]	15
Final test [PRESENCIAL][Self-study]	2
<b>General comments about the planning:</b> The beginning of the classes will depend on the official date established by the calendar of the Faculty of Letters. Local or national holidays may affect the planned schedule, in addition to the occurrence of current events that raise a topic of debate in the subject, and may monopolize part of the time planned for other activities. Field work and/or seminars/workshops may be carried out outside the hours established for the development of the classes, depending on the interests of the students and without altering the development of other teaching activities, on an autonomous basis.	
Unit 1 (de 6): THE IMPORTANCE OF WATER IN THE WORLD	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Practicum and practical activities report writing or preparation [AUTÓNOMA][Reading and Analysis of Reviews and Articles]	4
Writing of reports or projects [AUTÓNOMA][Group Work]	1
<b>Teaching period:</b> Weeks 1 to 2	
Group 23:	
<b>Initial date:</b> 29-01-2024	<b>End date:</b> 06-02-2024
Group 28:	
<b>Initial date:</b> 29-01-2024	<b>End date:</b> 06-02-2024
<b>Comment:</b> The beginning of the theoretical classes will depend on the calendar of the Faculty of Letters and the modifications that are applied from it. The first days of class, the bases of the subject, Teaching Guide, Evaluation Systems, etc. will be defined.	
Unit 2 (de 6): SURFACE HYDROGRAPHY: Runoff, hydrographic basin and river regimes	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	10
Workshops or seminars [PRESENCIAL][Group Work]	4
Practicum and practical activities report writing or preparation [AUTÓNOMA][Reading and Analysis of Reviews and Articles]	5
Writing of reports or projects [AUTÓNOMA][Group Work]	20
<b>Teaching period:</b> Weeks 2 to 7	
Group 23:	
<b>Initial date:</b> 06-02-2024	<b>End date:</b> 12-03-2024
Group 28:	
<b>Initial date:</b> 06-02-2024	<b>End date:</b> 12-03-2024
<b>Comment:</b> During this period, the necessary guidelines will be given to carry out the hydrogeography work and some classes will be left for the resolution of doubts and development of the work with the supervision of the teacher, provided that the students comply with the start and end time of the class sessions.	
Unit 3 (de 6): UNDERGROUND HYDROLOGY: basic notions of hydrogeology, the movement and quality of groundwater	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	3
Practicum and practical activities report writing or preparation [AUTÓNOMA][Reading and Analysis of Reviews and Articles]	5
Writing of reports or projects [AUTÓNOMA][Group Work]	10
<b>Teaching period:</b> Weeks 7 & 8	
Group 23:	
<b>Initial date:</b> 12-03-2024	<b>End date:</b> 18-03-2024
Group 28:	
<b>Initial date:</b> 12-03-2024	<b>End date:</b> 18-03-2024
<b>Comment:</b> During this period, the necessary guidelines will be given to carry out the practice corresponding to topic 3 with the supervision of the teacher.	
Unit 4 (de 6): SOIL DEFINITION AND COMPONENTS: Morphology and factors that influence soil formation	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	12
Workshops or seminars [PRESENCIAL][Group Work]	4
Practicum and practical activities report writing or preparation [AUTÓNOMA][Reading and Analysis of Reviews and Articles]	2
Writing of reports or projects [AUTÓNOMA][Group Work]	12
<b>Teaching period:</b> Weeks 8 to 11	
Group 23:	
<b>Initial date:</b> 18-03-2024	<b>End date:</b> 09-04-2024
Group 28:	
<b>Initial date:</b> 18-03-2024	<b>End date:</b> 09-04-2024
<b>Comment:</b> During this period, field work will be carried out in the hydrogeography work study area, whose guidelines will be given at the beginning of the course. The schedule for this period will be altered by the Easter holidays.	
Unit 5 (de 6): SOIL PROPERTIES AND SOIL PROCESSES	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	10
Workshops or seminars [PRESENCIAL][Group Work]	2

Practicum and practical activities report writing or preparation [AUTÓNOMA][Reading and Analysis of Reviews and Articles]	2
Writing of reports or projects [AUTÓNOMA][Group Work]	5
<b>Teaching period:</b> Weeks 11 & 14	
Group 23:	
<b>Initial date:</b> 09-04-2024	<b>End date:</b> 30-04-2024
Group 28:	
<b>Initial date:</b> 09-04-2024	<b>End date:</b> 30-04-2024
<b>Comment:</b> During this period, laboratory practices will be carried out under the supervision of the teacher.	
<b>Unit 6 (de 6): Soil Classifications: Soil Taxonomy and WRBSR (FAO)</b>	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	4
Practicum and practical activities report writing or preparation [AUTÓNOMA][Reading and Analysis of Reviews and Articles]	2
Writing of reports or projects [AUTÓNOMA][Group Work]	7
<b>Teaching period:</b> Weeks 14 & 15	
Group 23:	
<b>Initial date:</b> 30-04-2024	<b>End date:</b> 07-05-2024
Group 28:	
<b>Initial date:</b> 30-04-2024	<b>End date:</b> 07-05-2024
<b>Comment:</b> During this period, laboratory practices will be carried out, in the form of a seminar outside school hours and with the supervision of the teacher, with the possibility of requesting extra credits.	
<b>Global activity</b>	
<b>Activities</b>	<b>hours</b>
Workshops or seminars [PRESENCIAL][Group Work]	10
Study and Exam Preparation [AUTÓNOMA][Self-study]	15
Final test [PRESENCIAL][Self-study]	2
Class Attendance (theory) [PRESENCIAL][Lectures]	44
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	4
Writing of reports or projects [AUTÓNOMA][Group Work]	55
Practicum and practical activities report writing or preparation [AUTÓNOMA][Reading and Analysis of Reviews and Articles]	20
<b>Total horas:</b> 150	

10. Bibliography and Sources						
Author(s)	Title/Link	Publishing house	City	ISBN	Year	Description
VV.AA.	Atlas Nacional de España. Sección II Grupo 7: Edafología	IGN	Madrid		2004	
Zinck, J.A.	Geopedología. Elementos de Geomorfología para estudios de suelos y riesgos naturales	ITC Netherlands	Enschede	90 6164 339 2	2012	
Breña Puyol, A.F., Jacobo Villa, M.A.	principios y fundamentos de la Hidrología Superficial <a href="https://uamenlinea.uam.mx/materiales/licenciatura/hidrologia/principios_fundamentos/libro-PFHS-05.pdf">https://uamenlinea.uam.mx/materiales/licenciatura/hidrologia/principios_fundamentos/libro-PFHS-05.pdf</a>	Univ. Autónoma Metropolitana	Mexico		2006	
Gutiérrez Elorza, M.	Geomorfología <a href="https://es.scribd.com/doc/216501503/Geomorfologia-Mateo-Gutierrez-Elorza">https://es.scribd.com/doc/216501503/Geomorfologia-Mateo-Gutierrez-Elorza</a>	Pearson Prentice Hall	Madrid	978-84-8322- 389-5	2009	
de Pedraza Gilsanz, Javier	Geomorfología: Principios, Métodos y Aplicaciones	Rueda	Madrid	84-7207-087-5	1996	
Porta, J., López Acebedo, M., Roquero, C.	Edafología para la agricultura y el medio ambiente	Mundi Prensa		84-8476-148-7	2003	
Strahler, N., Strahler, A.	Geografía Física <a href="https://historiaygeografiauss.wordpress.com/tag/strahler-pdf/">https://historiaygeografiauss.wordpress.com/tag/strahler-pdf/</a>	Omega	Barcelona	84-282-0847-6	2005	
Dorronsoro, Carlos	EDAFOLOGÍA <a href="https://www.edafologia.net/">https://www.edafologia.net/</a>					
Brea, J.D., Balocchi, F.	Procesos de Erosión - Sedimentación en Cauces y Cuencas <a href="https://unesdoc.unesco.org/ark:/48223/pf0000228183">https://unesdoc.unesco.org/ark:/48223/pf0000228183</a>	PHI - UNESCO	Montevideo	978-92-9089- 177-2	12011	
Cobertera, E.	Edafología Aplicada  Hidrología e Hidrogeología  <a href="https://hidrologia.usal.es/">https://hidrologia.usal.es/</a>	Cátedra	Madrid  Universidad de Salamanca		1993	
	Edafología y Química Agrícola <a href="http://edafologia.ugr.es/index.htm">http://edafologia.ugr.es/index.htm</a>	Univ. Granada			2015	
Custodio, E., Llamas, M.R.	Hidrología Subterránea	Omega	Barcelona		1976	
Duchaoufour, P.	Manual de Edafología	Toray-Masson			1975	
Ferreras, C., Fidalgo, C.	Biogeografía y Edafología	Síntesis	Madrid		1999	
González, J., Giner, J., Pozo, M.	Geología Práctica  <a href="https://www.ingebook.com/ib/NPcd/IB_BooksVis?cod_primaria=1000187&amp;codigo_libro=1232">https://www.ingebook.com/ib/NPcd/IB_BooksVis?cod_primaria=1000187&amp;codigo_libro=1232</a>	Pearson Prentice Hall	Madrid	9788483225653	2008	
Llamas, J.	Hidrología General: Principios y aplicaciones	Univ. País Vasco	Bilbao		1993	

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Batteman, A.	Hidrología Básica y Aplicada	GITS	Barcelona	2007
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Tarbuck, E.J., Lutgens, K.L.	Ciencias de la Tierra. Una introducción a la Geología Física	Pearson	9788490353837	2013
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