

Academic Year/course: 2021/22

28733 - Extension of Surface Hydrology

Syllabus Information

Academic Year: 2021/22

Subject: 28733 - Extension of Surface Hydrology

Faculty / School: 175 - Escuela Universitaria Politécnica de La Almunia

Degree: 423 - Bachelor's Degree in Civil Engineering

ECTS: 6.0

Year: 4 and 3

Semester: Indeterminado

Subject Type: Compulsory

Module:

1. General information

1.1. Aims of the course

The main objective of the subject is to ensure that students acquire the necessary knowledge to develop hydrological engineering studies related to surface water resources.

This approach and this objective are in line with the following Sustainable Development Goals (SDGs) of the United Nations 2030 Agenda (<https://www.un.org/sustainabledevelopment/es/>), in such a way that the acquisition of the course learning outcomes provides training and competence to contribute to their achievement to some degree:

- Goal 5: Achieve gender equality and empower all women and girls (5.5)
- Goal 6: Ensure access to water and sanitation for all (6.3, 6.6)
- Goal 11: Make cities inclusive, safe, resilient and sustainable (11.4, 11.5)
- Goal 13: Take urgent action to combat climate change and its impacts (13.1, 13.3)

1.2. Context and importance of this course in the degree

The subject of *Extension of Surface Hydrology* is a course of the Civil Engineering Degree of the EUPLA (University of Zaragoza). It is a semestrial optional subject of the fourth year of the degree and has 6 ECTS credits.

1.3. Recommendations to take this course

The subject of *Extension of Surface Hydrology* has not mandatory prerequisites, although it is advisable to the students of the Degree in Civil Engineering have passed the subjects of *Hydraulic Engineering: Basics* and *Extensions of Hydraulic Engineering and Hydrology*.

2. Learning goals

2.1. Competences

As stated in the compulsory Specific Competence EH1 of the EUPLA Accademic Official Report of the Degree in Civil Engineering, the main competence of this subject will be to acquire knowledge of the concepts and technical aspects linked to the planning and management of surface water resources.

Finally, as generic competences, the student will acquire:

G01. Organizational and planning skills

G02. Capacity to solve problems

G03. Ability to make decisions

G04. Aptitude for oral and written communication of the native language

G05. Capacity for analysis and synthesis

G06. Ability to manage information

G07. Capacity for teamwork

- G08. Capacity for critical reasoning
- G09. Ability to work in an interdisciplinary team
- G10. Ability to work in an international context
- G11. Adaptation capacity to face new situations
- G12. Leadership aptitude
- G13. Positive social attitude towards social and technological innovations
- G14. Ability to reason, discuss and present your own ideas
- G15. Ability to communicate through words and images
- G16. Ability to search, analyze and select information
- G17. Capacity for independent learning
- G18. Acquire and understand knowledge in an area of study that starts from the general secondary education base and is usually supported by advanced textbooks, but includes some aspects that involve cutting-edge knowledge in this field
- G19. Apply their knowledge to their work or vocation in a professional way and acquire the competencies that are usually demonstrated through the elaboration and defense of arguments and problem solving within their area of study
- G20. Ability to collect and interpret relevant data (usually within their area of study) to make judgments that include reflection on relevant issues of a social, scientific or ethical nature
- G21. Transmit information, ideas, problems and solutions to a specialized and non-specialized audience
- G22. Develop those learning skills necessary to undertake further studies with a high degree of autonomy
- G23. Know and understand respect for fundamental rights, equal opportunities between women and men, universal accessibility for people with disabilities, and respect for the values of the culture of peace and democratic values.
- G24. Promote entrepreneurship
- G25. Knowledge in information and communication technologies.

2.2. Learning goals

The student, to pass this subject, should demonstrate having acquired the following learning outcomes:

- Knowledge and ability to develop hydrological engineering studies related to the project and the dimensioning of hydraulic structures.
- Specific knowledge on surface hydrology
- Specific knowledge about the planning and management of surface water resources.

2.3. Importance of learning goals

The subject of "Extension of Surface Hydrology" has a marked engineering character with direct and immediate application in the professional field of the civil engineering.

In particular, upon completing and passing this course, the student will acquire:

- Specific knowledge on surface hydrology related to hydrological loss models, rainfall-runoff transformation, flow propagation, water quality, etc.
- Knowledge to perform calculations and studies about hydrological engineering.

3. Assessment (1st and 2nd call)

3.1. Assessment tasks (description of tasks, marking system and assessment criteria)

Assessment tasks are the basic elements in the entire teaching-learning process since it is the only mechanism that allows, at any time during an educational period, to evaluate the degree of achievement of the proposed learning results and, if appropriate, apply the necessary corrections.

At the beginning of the course the student will choose one of the following two assessment methodologies:

- Continuous assessment system: it is an assessment system characterized by the obligation to participate in face-to-face activities of the subject and to take and pass practical tests, partial exams and academic works within the established deadlines. In the case the students passes all the continuous assessment tests, they will be exempt from the global exam.
- Global final evaluation exam: it is a final and global exam on all the theoretical and practical content of the subject.

Continuous evaluation system

Following the spirit of the reform of the European Higher Education Area (EHEA), the evaluation of the subject contemplates a continuous evaluation system as the most consistent to be in line with the guidelines set by this new framework. In the continuous assessment model, the professor will assess the student's participation in face-to-face activities

and their ability to solve problems and laboratory practices. Finally, the student should take and pass two partial exams ("continuous assessment exams") throughout the course.

The evaluation criteria to be followed for the activities of the continuous evaluation system are:

- **Laboratory tasks:** In each one of the laboratory activity, its development, results and conclusions will be evaluated. Once the practice is done, a report will be delivered by Moodle platform. This activity is valued from 0 to 10 points with a minimum score of 5 to be considered as approved. These activities will be carried out in groups of 2/3 students, while the report delivery will be individually. The final score will be the arithmetic average of the partial scores.
- **Proposed exercises and theoretical questions:** Responsible professors of the subject will propose exercises, problems, practical cases, theoretical questions, etc. to be solved individually. Report about these activities should be delivered according to specific scheduling and will be valued between 0 and 10 points. The final score will be the arithmetic average of the marks obtained in the partial deliveries.
- **2 written evaluation tests:** They will consist of the typical written exam scored from 0 to 10 points. The final score of this activity will be given by the arithmetic mean of the two tests. In case one the two partial scores will not reach the minimum score of 4, in this case the activity will be considered as not approved.

The weights of the above mentioned activities are following summarized:	
Individual works	5 %
Laboratory activities	15 %
Partial written exam 1	40 %
Partial written exam 2	40 %

Global final evaluation test

The students must choose this modality when, due to their personal situation, they cannot adapt to the rhythm of work required in the continuous assessment system, have failed any assessment test of the continuous evaluation process or would like to improve their score.

As in the continuous evaluation system, the global final evaluation test must be aimed at check if the learning results have been achieved, as well as contribute to the acquisition of various competencies. The global final evaluation test will have the following group of qualifying activities:

- **Laboratory practices:** The student will deliver a report of all the laboratory activities carried out during the course before the beginning of the global assessment written exam. test, as a sine qua non condition to pass the course. This activity will be valued from 0 to 10 points.
- **Written exam:** It will consist of a test that will contain questions and problems related to the topics explained throughout the course. This test will be valued between 0 and 10 points.

The weights of the above mentioned activities are following summarized:

Laboratory activity	15%
Written exam	85%

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The methodology followed in this course is oriented towards the achievement of the learning objectives. A wide range of face-to-face teaching and learning tasks are implemented, such as lectures, practice sessions, laboratory sessions, and tutorials.

The subject is based on a strong interaction between the professor and the student. This interaction is brought into being through a division of work and responsibilities between the students and the teacher. Nevertheless, it must be taken into account that, to a certain degree, students can set their learning pace based on their own needs and availability, following the guidelines set by the teacher.

If classroom teaching were not possible due to health reasons, it would be carried out on-line.

4.2. Learning tasks

This course is organized as follows:

- **Lectures:** Theoretical activities carried out mainly through exposition by the teacher, where the theoretical supports of the subject are displayed, highlighting the fundamentals, structuring them in topics and or sections, interrelating them.
- **Practice sessions:** The teacher resolves practical problems or cases for demonstrative purposes. This type of teaching complements the theory shown in the lectures with practical aspects.
- **Laboratory sessions:** The lecture group is divided up into various groups, according to the number of registered students, but never with more than 5 students, in order to make up smaller sized groups.

- **Tutorials:** Carried out giving individual, personalized attention with a teacher from the department, they can be on-site or online.
- **Autonomous work and study**
 - Study and understanding of the theory taught in the lectures.
 - Understanding and assimilation of the problems and practical cases solved in the practice sessions.
 - Preparation of seminars, solutions to proposed problems, etc.
 - Preparation of laboratory workshops, preparation of summaries and reports.
 - Preparation of the written tests for continuous assessment and final exams.

This course has 6 ECTS credits, which represents 150 hours of student work in the subject during the trimester, in other words, 10 hours per week for 15 weeks of class.

A summary of a weekly timetable guide can be seen in the following table. These figures are obtained from the course file in the Accreditation Report of the degree, taking into account the level of experimentation considered for this course is moderate.

Activity	Weekly school hours
Lectures	3
Laboratory	1
Other Activities	6

Nevertheless, the previous table can be shown in greater detail, taking into account the following overall distribution:

- 41 hours of lectures, with 50% theoretical demonstration and 50% solving different types of problems
- 15 hours of laboratory activities
- 4 hours of written assessment tests
- 90 hours of personal study, divided up over the 15 weeks of the semester.

4.3. Syllabus

This course will address the following topics:

Theory

- Topic 1: The Hydrologic Cycle
- Topic 2: Precipitation
- Topic 3: Hydrological losses
- Topic 4: Rainfall-runoff transformation methods
- Topic 5: Flow propagation
- Topic 6: Urban hydrology

Exercises and laboratory work

Most of the issues mentioned in the previous section are related to exercises to be done during the on-site classes. Moreover, the resolution of a practice based on the HEC-HMS Software is required to be developed and presented at the end of the course.

4.4. Course planning and calendar

The dates of the two final exams (1st and 2nd calls) will be those officially published on the EUPLA website. For students who opt for the continuous assessment system, the I continuous assessment exam will be held during the month of November and its date will be communicated on the first day of class. The second exam will be held on the last day of class.

The laboratory activity will be concentrated in the last two months of the semester. The following date will be the deadline for the delivery of the report related to this activity:

- Delivery of the report about laboratory activity: date of the exam of the first call.

The I continuous evaluation exam will consist of a written exam on theoretical topics (approximately 20%) and problems (approximately 80%) related to topics 1, 2 and 3.

The II continuous evaluation exam will be held on the last day of the course and will consist of a written exam on theoretical arguments (approximately 20%) and problems (approximately 80%) related to topics 4, 5 and 6.

The global evaluation exam will take place at the end of the semester (1st call) and in September (2nd call) and will consist of a global written test.

4.5. Bibliography and recommended resources

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=28733>