Universidad Zaragoza

Academic Year/course: 2023/24

60565 - Water resources and hydraulic facilities

Syllabus Information

Academic year: 2023/24
Subject: 60565 - Water resources and hydraulic facilities
Faculty / School: 201 - Escuela Politécnica Superior
Degree: 546 - Master in Agricultural Engineering
ECTS: 6.0
Year: 1
Semester: First semester
Subject type: Compulsory
Module:

1. General information

The objectives of the subject are:

To provide practical technical training in professional skills related to the concepts, procedures and technologies for the development of projects and management of water catchment and transport systems, with emphasis on free-flowing systems, with main application to irrigation, as well as river management in terms of flood studies, dam breakage, quantification and regulation of resources.

To know and integrate the knowledge and parameters of surface and groundwater hydrology in agronomic competences.

These approaches and objectives are aligned with Sustainable Development Goal 6, SDG, of the 2030 Agenda. Ensure the Availability and Sustainable Management of Water and Sanitation for All.

2. Learning results

To describe the technical aspects related to surface water hydrology.
To describe the main technical parameters of watersheds.
To perform and interpret hydrographs.
To describe the technical aspects related to groundwater hydrology and aquifers.
To describe and select the measurement systems related to hydrometry.
To describe and justify the technical characteristics and selection criteria of groundwater collection systems.
To design the pumping test of a well in order to measure and control the flow rate.
To justify technically the choice of an irrigation and drainage system.
To establish the hydrodynamics of free currents justifying the transients.
To describe and select the regulation and control systems for irrigation installations.
To be able to simulate the effects of floods and dam breaks.
To describe and technically justify the automation, regulation and control systems for irrigation installations, including telecontrol and SCADA systems.
To describe and technically justify the protection systems in irrigation installations

3. Syllabus

Theory and problems

Introduction, types of transport, SDG: hydrological paradoxes

Unidirectional duct flow

Free sheet transport, canal, river and irrigation applications

Control structures and channel control

Surface hydrology. Calculation of pluviometries, rainfall-runoff transformations

Groundwater hydrology. Well hydrodynamics.

Practical classes:

Stationary free sheet flow.

Transient flow

Transient flow with control structures

Free sheet irrigation

4. Academic activities

Master classes 30

The theoretical contents are taught in classroom. All teaching materials, notes, ppt, software, etc. are provided.

Problem solving and case studies 30

The practical contents of the subject are focused on professional work, and are developed on the one hand, through manual calculation exercises, and on the other hand, through the application of computer tools. The computer tool sessions require compulsory attendance.

Assessment tests 6

Study 60

Teaching and other activities 24

Development of one or two works, proposed by the teacher and related to the calculation of backwater curves and the computation of WEI+ in watersheds (related to the SDG). Small assignments or questions for resolution will also be proposed.

5. Assessment system

The subject is passed by means of a final exam, both in the first and in the second call, which has a maximum duration of 6 hours.

In addition, the results of the practical sessions, which are compulsory for passing the subject are controlled through the delivery of the correctly completed script. If a session is not attended, the student will be examined for that session in a special exam before the final exam.

The final test will be graded from 1 to 10. A grade higher than 5 is required to pass the subject. It will consist of two parts - theory and practice. The grade for the theoretical part must be higher than 25% of the total theory grade in order to add this grade to that of the practical part. If this is not the case, the grade will be that of the theoretical part. The practical part consists of the resolution of a series of exercises, with conceptual and calculation content, in which the following technical material is available: subject notes and material distributed by the teacher, a maximum of two additional texts, collections of problems and exercises solved by the student himself.

The grade for voluntary papers will be a maximum of 1 point for each paper. This final grade will be added only if the grade is higher than 0.5. If the student applies for the submission of a voluntary work and does not deliver it, there will be a grade penalty.

The resolution of small assignments or answers to questions proposed in class may add up to 0.1 points to the final grade.

The detailed definition of the assessment system will be explained in the presentation of the subject.

Success rates

2019/20	2020/21	2021/22
80,00%	89,47%	50,00%