Universidad Zaragoza

Academic Year/course: 2023/24

28945 - Irrigation and drainage systems

Syllabus Information

Academic year: 2023/24
Subject: 28945 - Irrigation and drainage systems
Faculty / School: 201 - Escuela Politécnica Superior
Degree: 583 - Degree in Rural and Agri-Food Engineering
ECTS: 6.0
Year: 4
Semester: First semester
Subject type: Optional
Module:

1. General information

This subject provides the knowledge for the design, calculation and management of irrigation and drainage systems.

The main objective of the subject is that the student is able to: a) determine the water needs and irrigation schedules of crops; b) design and manage irrigation systems in plots; c) design and manage zonal and plot drainage systems d) design collective irrigation networks by means of pressurized pipes, including hydraulic works.

These approaches and objectives are aligned with the following Sustainable Development Goals (SDGs) of the United Nations Agenda 2030 () 2030 of the United Nations (https://www.un.org/sustainabledevelopment/es/), contributing to some extent to their achievement: Goal 2: Zero hunger (target 2.4); Goal 6: Clean water and sanitation (target 6.4).

2. Learning results

1. Describe and summarize the current state of irrigation and discuss its possible future evolution.
2. Interpretation of water legislation.
3. Identify and evaluate the most relevant properties of soil and water to determine their suitability for irrigation.
4. Forecast the water requirements of different crops to set the design flow of an irrigation system and plan the most appropriate irrigation schedule for each crop, thus contributing to the efficient use of resources and ensuring the sustainability of freshwater abstraction and supply to cope with water scarcity (in line with SDG targets 2.4 and 6.4).
5. Calculate the water balance in the soil.
6. Describe and understand the fundamentals of surface irrigation.
7. Describe the elements of pressurized irrigation networks, classify the different sprinkler irrigation systems on a plot and compare them.
8. Understand the fundamentals of spot irrigation and use them for the agronomic and hydraulic design of case studies (aligned with SDG targets 2.4 and 6.4).
9. Ability to explain and express the principles of water movement in soil.
10. Design of parcel and zonal drainage systems.

3. Syllabus

1. Current state of irrigation
2. Soil, water and plant properties related to irrigation
3. Sprinkler irrigation
4. Localized irrigation
5. Surface irrigation
6. Irrigation networks and their small hydraulic works
7. Drainage

4. Academic activities

Lectures: 30 h

Theoretical-practical sessions in which the contents of the subject will be explained.

Problems and cases: 25 h

Sessions of problems and cases in which the contents of the course will be developed:

Special practices in installations: 5h

Personal study: 87 h

Assessment tests. 3 h

5. Assessment system

The assessment of this subject will NOT be done on a continuous basis.

The assessment activity will consist of a global written test in accordance with the syllabus of the subject (theoretical sessions and problems) and according to the date programmed in the EPS exam calendar for the two official exam calls.

The overall final test will consist of a written exam consisting of 2 different blocks of limited duration.

- Block 1: 10 questions of theoretical-practical content to be answered without the support of documentation.
- Block 2: resolution of 4 or 5 problems related to irrigation systems, drainage and hydraulic works the resolution of these problems may be supported by printed documentation provided by the student.

Alignment with the SDGs

The acquisition of the competences related to goals 2.4 and 6.4 will be evaluated mainly through the problems of agronomic design, water balance and design of high frequency localized irrigation systems.

Assessment criteria

- The concision and accuracy of the answers.
- The correct use of units in magnitudes.
- The approach to problem solving.
- The accuracy of the numerical results, as well as the order, presentation and interpretation of the results.
- Clarity in diagrams, figures and graphic representations.
- Spelling mistakes.

Calculation of the final grade:

The final grade (CF) out of 10 points, will be obtained by applying the following equation:

CF = [0.3 x Note B1] + [0.7 x Note B2]

In order to pass (CF ≥ 5.0) it is essential that: [grade B1 ≥ 4.0] and [grade B2 ≥ 4.0]

In the event that the above requirements are not met, the final grade will be obtained as follows:

- If CF ≥ 4, the final grade will be: Fail (4.0)
- If CF < 4, the final grade will be: Fail (CF)

The grade for activities B1 and B2 will not be saved for subsequent examinations.

Success rates in previous years

The success rates for the last three years have been: 2019/20: 66,67%; 2020/21: 37,50%; 2021/22: 91,67%