Universidad Zaragoza

Academic Year/course: 2023/24

30118 - Fluid Mechanics

Syllabus Information

Academic year: 2023/24
Subject: 30118 - Fluid Mechanics
Faculty / School: 175 - Escuela Universitaria Politécnica de La Almunia
Degree: 425 - Bachelor's Degree in Industrial Organisational Engineering
ECTS: 6.0
Year: 2
Semester: Second semester
Subject type: Compulsory
Module:

1. General information

The main objective of the subject is to provide students with knowledge of the concepts and technical aspects related to hydrostatic systems and pressurized piping systems.

These approaches and objectives are aligned with the following Sustainable Development Goals (SDGs) of the United Nations Agenda 2030 (https://www.un.org/sustainabledevelopment/es/), in such a way that the acquisition of the learning results of the subject provides training and competence to contribute to some extent to their achievement: 4.4 By 2030, significantly increase the number of young people and adults who have the necessary skills, in particular technical and vocational skills, to access employment, decent work and entrepreneurship

2. Learning results

- Know how to describe a flow by means of its characteristic lines.
- Interpret the physical meaning of conservation equations.
- Know how to balance mass, forces, angular momentum and energy over control volumes.
- Employ dimensional analysis techniques to design experiments and order of magnitude analysis to simplify problems .
- Know the characteristics of the main flows of interest in engineering (external aerodynamics, duct flow, boundary layer flow, thin film flow),
- Know the working principles and operation of basic instruments for measuring pressure, flow, velocity and viscosity.

3. Syllabus

Theoretical contents

Topic 1 Introduction to Hydraulic Engineering.

Topic 2 Hydrostatics.

Topic 3 Fluid kinematics.

Topic 4 Fluid dynamics.

Topic 5 Hydraulic pumps, valves and water hammer.

Topic 6 Calculation of pressure pipes and channels.

Practical contents

Practice 1 Pressure gauges.

Practice 2 Viscosity.

Practice 3 Definition of the hydrostatic thrust on a floodgate.

Practice 4 Venturimeter.

4. Academic activities

Expository classes: These are lectures on theoretical arguments or problem solving given in an expository manner by the teacher.

Laboratory practices: Practical activities carried out in the laboratories under the tutoring of the subject's teachers, which will be followed by autonomous activities by the students.

Individual tutorials: they can be face-to-face or virtual through the virtual teaching portal (Moodle) or through the University of Zaragoza's e-mail of the University of Zaragoza.

Group tutoring: Activities focused on student learning developed by the teacher who meets with a group of students to solve

group doubts or develop resolutions of exams or problems of commoninterest.

5. Assessment system

Global continuous assessment test.

Laboratory practices: In each of the practices, the results and conclusions obtained and the process followed will be evaluated . Once the practices has been completed, an individual report of them is handed in. The final grade will be the arithmetic mean. (15% of the grade, minimum 5 out of 10).

Written assessment tests: There will be 2 tests consisting of the typical written exam (theory and problems). The final grade for this activity will be given by the arithmetic mean of these tests, provided that there is no unit grade below 4 points, in which case the activity will be failed (80% of the grade, minimum 5 out of 10).

Proposed exercises and theoretical questions: The professor will propose exercises, problems, practical cases, theoretical questions, etc. to be solved individually (5% of the grade, minimum 5 out of 10)

Global final assessment.

Laboratory practices: The student will deliver a report of all the practices (carried out during the term). Of these practices will respond in writing to questions posed by the teacher (20% of the grade, minimum 5 out of 10).

Written evaluation tests: It will consist of a test containing questions and problems related to the topics explained throughout the term (80% of the grade, minimum 5 out of 10)