

29752 - Industrial hydraulics and pneumatics

Syllabus Information

Academic year: 2023/24

Subject: 29752 - Industrial hydraulics and pneumatics

Faculty / School: 110 - Escuela de Ingeniería y Arquitectura

Degree: 434 - Bachelor's Degree in Mechanical Engineering

ECTS: 6.0

Year: 4

Semester: Second semester

Subject type: Optional

Module:

1. General information

The objectives of the subject are

1. To know the practice of Fluid Engineering for the development of pneumatic and hydraulic circuits in industrial environments.
2. To master the generation, transport and application of the energy accumulated in a fluid to transform it into mechanical energy.

The subject plan proposes the achievement of the 2030 SDGs: Goal 7. AFFORDABLE AND NON-POLLUTANT ENERGY (7.2 and 7.3), Goal 8. DECENT WORK AND ECONOMIC GROWTH; Goal 9: INDUSTRY, INNOVATION AND INFRASTRUCTURE (9.4), Goal 12. RESPONSIBLE PRODUCTION AND CONSUMPTION (12.4)

Due to its strong practical focus on the application of pneumatic and hydraulic circuits in machines and vehicles, it can also be considered as a good complement in the intensification of the subject Machines and Vehicles, as well as Manufacturing Engineering.

2. Learning results

1. Identifies and knows the functionality of the elements that are part of pneumatic and hydraulic circuits, as well as their standardized representations
2. Is qualified to design a pressurized fluid generation and distribution network. Both oil and air.
3. Knows how to analyse the operation of a pneumatic or hydraulic circuit.
4. Is able, starting from the knowledge of the need of the mechanical work to be done, to design a pneumatic and hydraulic circuit that performs it, both intuitively and systematically

The learning results of the subject provide the student with a basic knowledge and the methodological tools necessary to interpret and solve problems in the technologies in which pneumatics and hydraulics play an important role.

3. Syllabus

INTRODUCTION

- Characteristics and uses of Hydraulics and Pneumatics.
- Coincidences and differences.

VALVES

- Direction control, pressure regulation and flow regulation.
- Types. Constitution. Operation. Uses

ACTUATORS

- Linear and rotary. Types. Characteristics.

ELEMENTARY CIRCUITS

- Examples of basic circuits.
- Behavioural analysis.
- Introduction of auxiliary elements participating in the circuits.

SYSTEMATIC DESIGN.

- Design rules. Cascading and step-by-step memory structure.

DIMENSIONING OF INSTALLATION ELEMENTS.

- Diagrams of valve operation, flow rates, positions and volumes.
- Calculation of deposits.

GENERATION AND TRANSPORT OF PRESSURIZED FLUID

- Pumping Groups and Compressors.
- Types, functionalities and characteristics.
- Compressed air conditioning.
- Distribution networks.

4. Academic activities

Synchronous classes. 2 hours per week in which the teacher will explain the basic principles and solve selected problems. Student participation in this activity will be encouraged through the planning of problem classes.

Practical examples (4 or 5 sessions) whose evaluation will be part of the final grade of the subject They will be carried out in groups and in supervised time. The timetable will be planned by the center, but options will be offered to avoid coincidences at the beginning of the subject.

Resolution of cases (8 sessions) whose evaluation will be part of the final grade of the subject They will be carried out on an individual basis in supervised time.

Company visit practices If circumstances permit, visits will be made to manufacturing plants.

Autonomous work.

Tutorials.

5. Assessment system

Continuous assessment:

The student must demonstrate that he/she has achieved the expected learning results through:

1. The completion of 3 individual assignments during the term They will account for 45% of the grade.
2. The reports of the practical part and case resolution will be valued. Its weight will be 55% of the grade.

A minimum grade of 3 out of 10 must be obtained in each of the parts.

Overall assessment

Those students who do not complete the proposed continuous assessment tests throughout the semester may opt to pass the subject by means of the global assessment test that will be scheduled on the dates of the centre's official exam calendar. They will consist of two activities that will account for 100% of the student's grade.

- a written test with a part of concept questions and another part of analysis and/or synthesis of circuits, which will constitute 60% of the final grade
- a practical test that will constitute 40% of the final grade.

In each of the tests it will be necessary to obtain a minimum grade of 4 out of 10.