

29734 - Industrial Heat and Cold

Syllabus Information

Academic year: 2023/24

Subject: 29734 - Industrial Heat and Cold

Faculty / School: 110 - Escuela de Ingeniería y Arquitectura

Degree: 434 - Bachelor's Degree in Mechanical Engineering

ECTS: 6.0

Year: 4

Semester: First semester

Subject type: Optional

Module:

1. General information

Context and meaning of the subject in the degree. The subject is a natural continuation of Thermal Engineering, deepening in the technology, design and analysis of thermal installations. The methodology of thermal engineering is applied to approach, analyse, model and simulate thermal energy production and distribution equipment and facilities.

The Industrial Heating and Cooling subject provides the fundamental principles for understanding, designing and operating the equipment and facilities for the production of energy services essential for industry and the residential-commercial sector.

Recommendations to take the subject.

- It is essential that the student has passed the subjects Technical Thermodynamics and Fundamentals of

Heat Transfer and Thermal Engineering.

- It is recommended that the student actively attends the theoretical and practical classes, as well as a continuous study of the contents of the subject, the preparation of the practical cases that can be solved in later sessions, the study of the scripts and the continuous elaboration of the results.
- Continuous work is essential to pass this subject with the best possible results, since each part is studied gradually with a progressive procedure. Therefore, when doubts arise, it is important to resolve them as soon as possible to ensure the correct progress in this matter. To help students solve their doubts, they can count on the teacher's advice, both during classes and in the tutoring hours destined for this purpose.

In accordance with the commitment of both the University of Zaragoza and EINA to the 2030 Agenda that promotes the sustainable human development, the objectives of this subject are aligned with several of the Sustainable Development Goals, SDGs, of the 2030 Agenda (<https://www.un.org/sustainabledevelopment/es/>) and certain specific goals, in such a way that the acquisition of the learning results of the subject provides training and competence to the student to contribute to some extent to their achievement: Goal 7 (7.2 and 7.3), Goal 9 (9.4), Goal 11 (11.6) and Goal 13 (13.2 and 13.3).

2. Learning results

Upon completion of the subject, the student will be able to:

- Know the functional and descriptive aspects of energy service installations in industry and buildings.
- Relate the knowledge and skills acquired in previous subjects to their application in heating and cooling systems.
- Know how to select equipment and design installations for the production, distribution and storage of heat and cold.
- Use professional computer tools and handle different sources of information.
- Know how to apply the economic criteria and the principles of thermal integration to heating and cooling production systems
- Know the regulations on safety, energy efficiency and environmental protection in heating and cooling systems

3. Syllabus

- Regulatory framework.
- Humid air and comfort conditions.
- Calculation and analysis of thermal loads.
- Primary/production: cooling, heating
- Secondary/distribution: terminal units
- Types of installations. Schemes of principle.
- Fluid distribution networks.
- Energy saving. Indicators.

4. Academic activities

The following academic activities will be carried out in the subject:

- Master classes: Expository sessions of theoretical contents and application. The basic concepts and fundamentals of thermal equipment and installations will be presented. Practical cases of application of the systems studied will be explained.
- Laboratory practices. Estimated duration per session: 3 h. The student becomes familiar with thermal systems in operation and with the collection and analysis of experimental data. Applies the procedures of the subject and delivers a report of results.
- Practices with computer tools. Estimated duration per session: 3 h. The student learns to solve problems typical of Thermal Engineering by means of computer tools. Applies the knowledge of the subject to the resolution of problems and practical cases and deliver a report of results.
- Evaluates knowledge and skills by means of several partial tests carried out throughout the four-month period during class time

5. Assessment system

Continuous assessment:

- Participation in the teaching activities and in the scheduled partial evaluation tests (70%)
- Completion of the practices: follow-up, attention and completion of the reports and/or questionnaires associated with each session (30%)

First and second call:

All students who wish to do so or who have not passed the continuous evaluation may sit for the official exams of each call. In each of the two exams, the exam will consist of a global test on the theoretical and practical contents of the subject (100%).

Assessment criteria and levels of demand:

- In all evaluation activities, the following aspects and qualities will be assessed to the degree indicated in each case
- Own performance of the assignments: if plagiarism or fraudulent copying is detected in the performance of the activities, the corresponding grade will be zero
- Correct approach to the procedure for solving the cases and exercises.
- Correctness and clarity in written and oral communication: correct spelling and grammar, correct expression, coherent content structure.
- Concreteness and accuracy of the results obtained.
- Critical analysis of the results: knowledge of the state of the art, coherence of the results presented, relation with other degree subjects, possibilities for improvement and continuation.
- Delivery in the format, procedure and deadline indicated by the teacher: reports will not be accepted after the deadline, unless there is a duly justified cause.