

Course guide

320130 - CI - Air Conditioning Systems and Instrumentation

Last modified: 11/04/2025

Unit in charge: Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 724 - MMT - Department of Heat Engines.
729 - MF - Department of Fluid Mechanics.

Degree: BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Optional subject).

Academic year: 2025 **ECTS Credits:** 6.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: Òscar Ribé
Gustavo Adolfo Raush Alviach

Others: Gustavo Adolfo Raush Alviach
Robert Castilla
Viktorov Danov Stoyan
Òscar Ribé

PRIOR SKILLS

Students might have passed the subjects of Thermal Engineering and Thermal Systems.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Transversal:

1. SELF-DIRECTED LEARNING - Level 2: Completing set tasks based on the guidelines set by lecturers. Devoting the time needed to complete each task, including personal contributions and expanding on the recommended information sources.
2. TEAMWORK - Level 2. Contributing to the consolidation of a team by planning targets and working efficiently to favor communication, task assignment and cohesion.

TEACHING METHODOLOGY

- Theoretical sessions and resolution of exercises.
- Work in group
- Independent work and study exercises.

The problem-based sessions introduce the theoretical foundations of the subject, concepts, methods and results through solved exercises.

The sessions of practical work in the classroom (problems) will include problem solving and application development HVAC project in a group with their final oral presentation.

LEARNING OBJECTIVES OF THE SUBJECT

Learn and apply the basic theoretical concepts of environmental comfort in order to achieve the ability to calculate design, analyze and work with equipment and air conditioning systems.
Develop specific skills .

STUDY LOAD

Type	Hours	Percentage
Self study	90,0	60.00
Hours small group	30,0	20.00
Hours large group	30,0	20.00

Total learning time: 150 h

CONTENTS

TOPIC 1: Introduction to HVAC

Description:

- The concept of comfort
- Comfort, energy and sustainability
- The production of heat and cold

Full-or-part-time: 30h

Theory classes: 8h

Practical classes: 8h

Self study : 14h

TOPIC 2: Descriptive elements and facilities

Description:

- 2.1. Basic description of the machine and its accessories
- 2.2. Operations with the splitter plate
- 2.3. Calculation of straight and helical gears

Full-or-part-time: 30h

Theory classes: 8h

Practical classes: 8h

Self study : 14h

TOPIC 3: Characteristic parameters of the thermal envelope

Description:

- Thermal transmittance
- Solutions taken in isolation
- HE-1 Basic Requirement

Full-or-part-time: 30h

Theory classes: 8h

Laboratory classes: 8h

Self study : 14h



TOPIC 4: Calculation of thermal loads

Description:

- Climate and weather databases
- Thermal winter load
- Summer heat load
- Thermal load due to internal generation. Latent heat

Full-or-part-time: 60h

Theory classes: 6h

Practical classes: 6h

Self study : 48h

GRADING SYSTEM

- Group delivering activities (lab) - 30%
- Group delivering activities (application) - 30%
- Mid-term exam - 20%
- Final exam- 20%

BIBLIOGRAPHY

Basic:

- ASHRAE handbook: fundamentals. SI Edition. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, cop. 1997. ISBN 1883413451.
- ASHRAE handbook: heating, ventilating and air-conditioning systems and equipment. SI ed. Atlanta: American Society of Heating, Ventialting and Air-Conditioning Engineers, 1992. ISBN 10786066.
- ASHRAE handbook: refrigeration. SI ed. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, 1994-. ISBN 19307217.