

Course guide

330801 - TF - Thermal Fluid Technologies

Last modified: 24/07/2026

Unit in charge: Manresa School of Engineering
Teaching unit: 750 - EMIT - Department of Mining, Industrial and ICT Engineering.

Degree: MASTER'S DEGREE IN INDUSTRIAL FACILITY DESIGN AND MANAGEMENT (Syllabus 2026). (Compulsory subject).

Academic year: 2026 **ECTS Credits:** 5.0 **Languages:** Catalan

LECTURER

Coordinating lecturer: Francisco Pérez Ràfols

Others:

TEACHING METHODOLOGY

Masterclasses
Solving small-scale projects with the help of computer programs

LEARNING OBJECTIVES OF THE SUBJECT

The subject contributes to the following learning outcomes:

M1.K1: Identify the legislation and regulations corresponding to the different types of installations common in industry.

M1.K2: Explain the fundamental scientific and technical concepts of fluid mechanics, heat transfer and electrical circuits.

M1.K3: Describe the basic components of the different types of common industrial installations, as well as their operation.

M1.S1: Apply the fundamental scientific and technical concepts of fluid mechanics and heat transfer to the calculation of the behavior of complex fluid networks.

M1.S3: Apply the fundamental scientific and technical concepts of electricity to the calculation of electrical energy receiving installations, including protection devices.

M1.RAT_UPC_5.1: Devise creative solutions for complex fluid, heat, humidity and electrical energy transport networks, using technical knowledge and selection, validation and evaluation tools for their technical implementation

STUDY LOAD

Type	Hours	Percentage
Hours large group	45,0	100.00

Total learning time: 45 h



CONTENTS

Fluid and heat transfer networks

Description:

Introduction to fluid network modeling
Series and parallel networks, branched networks and fan networks
Basic air conditioning installations
Heat loss
Condensation
Fluid expansion

Full-or-part-time: 40h
Laboratory classes: 15h
Self study : 25h

Transients in fluid networks

Description:

Mass transients (fluctuations)
Pressure transients (water hammer)
Controlled networks
Inertia and time lags in installations

Full-or-part-time: 40h
Theory classes: 15h
Self study : 25h

Exergy

Description:

Exergy analysis to identify failures or points that require modifications.

Full-or-part-time: 22h 30m
Laboratory classes: 7h 30m
Self study : 15h

title english

Description:

Piping and insulation materials
Connections, valves, filters, etc.
Refrigerants

Full-or-part-time: 22h 30m
Laboratory classes: 7h 30m
Self study : 15h



GRADING SYSTEM

Any academic fraud, plagiarism or use or possession of unauthorised means in an assessment activity leads to a mark of zero (0) for the affected test or assignment. Furthermore, in accordance with the University's regulations, if disciplinary proceedings are initiated the subject is recorded as "Pending Assessment" until a decision is reached. These incidents are managed in accordance with the [Action Framework for Academic Integrity in Assessment at the UPC](#).

Fluid Thermal Network Projects: 30%

Transient Projects in Fluid Networks: 30%

Exergy Projects: 10%

Auxiliary Construction Aspects and Regulations Projects: 10%

Oral Exam: 20%

EXAMINATION RULES.

To pass the subject, students must achieve at least a 5/10 average grade for the course. They must also pass the oral exam with a grade of more than a 3.5.

BIBLIOGRAPHY

Basic:

- ASHRAE handbook. Atlanta, GA: American Society of Heating, Refrigerating and Air-Conditioning Engineers, 1985-. ISBN 1523-7230.

RESOURCES

Other resources:

Material in Atenea