

28953 - Agri-food industry installations

Información del Plan Docente

Academic Year	2016/17
Academic center	201 - Escuela Politécnica Superior
Degree	437 - Degree in Rural and Agri-Food Engineering
ECTS	6.0
Course	4
Period	First semester
Subject Type	Compulsory
Module	---

1.Basic info

1.1.Recommendations to take this course

1.2.Activities and key dates for the course

2.Initiation

2.1.Learning outcomes that define the subject

2.2.Introduction

3.Context and competences

3.1.Goals

3.2.Context and meaning of the subject in the degree

3.3.Competences

3.4.Importance of learning outcomes

4.Evaluation

5.Activities and resources

5.1.General methodological presentation

The learning process designed for this course is based on the following teaching modalities:

A combination of theory sessions (master classes), problem-solving based learning and usage of specific software tools.

5.2.Learning activities

The program that the student is offered to help him/her achieve the expected results includes the following

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activities:

- Lectures (master classes).
- Engineering problem-solving sessions.
- Lab sessions (using software tools).
- Guided and individual self-study.
- Assessment activities.

5.3.Program

Theory Programme

Topic 1: Hydraulic installations in the food processing industry

Topic 2: Energy installations in the food processing industry

Topic 3: Hot production

Topic 4: Fuels

Topic 5: Cold production

Topic 6: Refrigerators

Topic 7: Refrigeration compressors

Topic 8: Condensers

Topic 9: Evaporators

Topic 10: Thermal balance in a refrigeration installation

Topic 11: Standards and Regulations.

Programme of Laboratory Practicals

Practical 1. Energy balance of a heating system with natural gas or petroleum liquid gas.

Practical 2. HE4 application of technical building code.

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Practical 3. Representation of R134a refrigeration cycle on the Mollier diagram, P (kg/cm²)- I (kJ/kg) based on data obtained in the experimental equipment: Refrigerated chambers and freezing in the laboratory, TRI model.

Practical 4. Determining thermal conductivities and estimating the refrigeration times of apples and oranges.

5.4.Planning and scheduling

It is estimated that an average student should devote to this course (6 ECTS) a total number of 150 hours.

Schedule

Week	Theoretical sessions (h)	Practical sessions (h)	Autonomous work (h)	Total (h)
1	2	2	6	10
2	2	2	6	10
3	2	2	6	10
4	2	2	6	10
5	2	2	6	10
6	2	2	6	10
7	2	2	6	10
8	2	2	6	10
9	2	2	6	10
10	2	2	6	10
11	2	2	6	10
12	2	2	6	10
13	2	2	6	10

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14	2	2	6	10
15	2	2	6	10
Total (h)	30	30	90	150

5.5. Bibliography and recommended resources

Basic Bibliography (in Spanish language):

- Amigo Martín, P., Termotecnia: aplicaciones industriales . Mundi-Prensa. Madrid.
- López Gómez, A., Las instalaciones frigoríficas en las industrias agroalimentarias . A. Madrid Vicente, ediciones, 1994.

Additional Bibliography (in Spanish language):

- Balboa, J., Manual de instalaciones frigoríficas . Ediciones Ceysa. Barcelona, 2000.
- IDAE, Manuales técnicos y de instrucción para conservación de energía . Instituto para la Diversificación y Ahorro de la Energía.
- Ministerio de Industria, Turismo y Comercio. Madrid. 2006. Reglamento técnico de distribución y utilización de combustibles gaseosos y sus instrucciones técnicas complementarias ICG 01 a 11 .
- Ministerio de Industria y Energía. Madrid. 1998. Reglamento de seguridad para plantas e instalaciones frigoríficas (RSF) .
- Ministerio de Industria y Energía. Madrid. 2007. Reglamento de Instalaciones Térmicas en los Edificios (RITE) .
- Ministerio de Vivienda. Madrid. 2006. Código Técnico de la Edificación (CTE) .

URL Links:

<http://www.alfalaval.com>

<http://www.bitzer.de>

<http://www.directindustry.es>

<http://www.frigopack.com>

<http://www.johnsoncontrols.com>