28615 - Installations I

Información del Plan Docente

Academic Year	2017/18
Faculty / School	175 - Escuela Universitaria Politécnica de La Almunia
Degree	422 - Bachelor's Degree in Building Engineering
ECTS	6.0
Year	2
Semester	Second semester
Subject Type	Compulsory
Module	---

1.General information

1.1.Introduction

1.2.Recommendations to take this course

1.3.Context and importance of this course in the degree

1.4.Activities and key dates

2.Learning goals

2.1.Learning goals

2.2.Importance of learning goals

3.Aims of the course and competences

3.1.Aims of the course

3.2.Competences

4.Assessment (1st and 2nd call)

4.1.Assessment tasks (description of tasks, marking system and assessment criteria)

5.Methodology, learning tasks, syllabus and resources

5.1.Methodological overview

The learning process that has been designed for this subject is based on the following:

- **Lectures** : from the first day of the course, the student will begin to solve practical cases on facilities. In each case, the teacher will provide the plans of a building and through the application of rules and regulations, the students will design and calculate the installation suggested. The teacher will be a support to guide them in the application of the regulations and explain, at certain times, the part of the installation that is necessary. The teacher will have slides

with graphic examples that will make it easier for students to understand the facilities being designed.
- **Practical lessons in the computer room** : They will be used to carry out a complete practical case of a building. There will be 8 sessions of 2 hours of practice for the production of the report, calculations and plans of the facilities in the suggested building.
- **Individual tutorials** : Carried out through personalized attention, individually, of the teacher in the department. These tutorials can be held in the classroom or virtually.

5.2.Learning tasks

The program offered to the student to help achieve the expected results includes the following activities outlined above:

- Lectures
- Practical lessons in the computer room
- Individual tutorials

The global distribution of the subject will be as follows:

- 40 classroom hours to solve practical cases.
- 16 hours of practice tasks and supervised work, in 2-hour sessions.
- 4 hours of written tests (two hours per test)
- 40 hours of group work, over the 15 weeks of the semester.
- 50 hours of personal study, over the 15 weeks of the semester.

5.3.Syllabus

tents of the subject.

The contents will be studied through practical cases applied to different types of buildings:

Unit 1. Cold water installations.

1.1. Regulations on cold water installations.

1.2. Design of the installation: distribution systems, schemes and materials used in the development of cold water installations.

1.3. Testing and implementation of cold water installations

1.4. Practical cases on cold water installations:

- Design and calculations in single-family housing.
- Design and calculations on complete installations in housing building from hook-up to points of consumption.
- Calculation of pressure group.
- Hook-up calculations in other types of buildings.

Unit 2. Hot water installations.

2.1. ACS production systems: components and installation diagrams.

2.2. Solar ACS systems: components and installation diagrams.

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2.3. Applicable regulations to ACS installations.

2.4. Testing and implementation of ACS facilities.

2.5. Practical case studies of ACS facilities, including compliance with HE-4 (minimum solar contribution from ACS):

- Calculation of boilers for individual and collective installations, and for different typologies of buildings.
- Calculation of pipelines and elements of the installation, both individual and collective.
- Calculation of solar energy installations including solar energy collector fields, tanks, pipelines, pumps, heat exchangers and installation elements.
- Calculation of losses by orientation and shadows on solar panels.

Unit 3. Sanitation facilities.

3.1. Applicable Regulations to sanitation facilities.

3.2. Design of the installation: components, distribution systems and materials to be used in the installation.

3.3. Testing and execution of sanitation facilities.

3.4. Case studies of sanitation facilities:

- Calculation of small evacuation networks
- Calculation of down pipes
- Calculation of collectors and catch basins
- Hook-up calculation
- Calculation of pumping systems for wastewater
- Calculation of ventilation

Unit 4. Heating installations.

4.1. Applicable Regulations to thermal installations.

4.2. Heating systems: diagrams and distribution systems for buildings.

4.3. Components of heating systems: types of boilers, chimneys, fuels used, heat emitters.

4.4. Machine rooms for heating and ACS.

4.5. Execution of heating installations.

4.6. Practical cases of heating installations:

- Introduction to CTE HE-1: Calculation of enveloping thermal transmittances.
- Calculation of thermal loads.
- Calculation of thermal emitters, hydraulic circuits and calculation of heat generation equipment.

Practical contents

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Each topic discussed in the previous section has associated practices. The layout of a building in Autocad will be provided and the student will have to develop the following facilities:

- Practice 1. Design and calculation of the cold water installation in a residential building.
- Practice 2. Design and calculation of the ACS installation in a residential building.
- Practice 3. Design and calculation of the sanitation installation in a residential building.
- Practice 4. Design and calculation of the heating installation in a house.

5.4.Course planning and calendar

Calendar of on-site sessions and presentation of works

The following table shows the indicative timetable that includes the development of the activities presented previously, and may vary according to the development of the teaching activity.

Activity	Teaching Week															Hours
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	P
Unit 1	4	4	2													8
Unit 2				2	4	4	2									7
Unit 3								2	2	2	2					7
Unit 4												4	2	2	2	8
Practice 1			2	2												6
Practice 2							2	2								7
Practice 3										2	2					7
Practice 4													2	2		6
Test 1									2							2

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Test 2															2	2
Group work	3	3	3	3	3	3	3	3	0	3	3	3	3	3	1	40
Personal Study	3	3	3	3	3	3	3	3	6	3	3	3	3	3	5	50
Total	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**150**

The dates of the final exams will be those published officially in http://www.eupla.es/secretaria/academica/examenes.html.

The written assessment tests will be related to the following topics:

- Test 1: Items 1 and 2.

- Test 2: Topic 3 and 4.

5.5.Bibliography and recommended resources

THE UPDATED BIBLIOGRAPHY OF THE SUBJECT IS CONSULTED VIA THE LIBRARY'S WEB PAGE

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28615&Identificador=13189

BB	España. Ministerio de la Vivienda. Código Técnico de la Edificación / edición preparada por Departamento de Redacción Aranzadi. - 2ª ed. Cizur Menor (Navarra) : Aranzadi, 2008
BB	Reglamento de instalaciones térmicas en los edificios : nuevo RITE Madrid : El instalador, D.L. 2007
BC	Abecé de las instalaciones / coordinador, Roberto Alonso González Lezcano ; autores, Roberto Alonso Gonzalez Lezcano ... [et al.] Madrid : Munilla-Lería, 2012-2013
BC	Arizmendi Barnes, Luis Jesús. Cálculo y normativa básica de las instalaciones en

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BC	los edificios. Tomo 1, Instalaciones hidráulicas, gases combustibles y de ventilación / Luis Jesús Arizmendi. - 7ª ed. renovada Pamplona : EUNSA, 2005
BC	Arizmendi Barnes, Luis Jesús. Cálculo y normativa básica de las instalaciones en los edificios. Tomo 2, Instalaciones energéticas / Luis Jesús Arizmendi . - 6ª. ed. renovada Pamplona : EUNSA, 2003
BC	Bobes, Arcadi de. Las instalaciones en el proyecto ejecutivo : instalaciones de fontanería / Arcadi de Bobes, Josep Antoni Tribó. - 1ª edc Barcelona : Col·legi d'Arquitectes de Catalunya Demarcació de Barcelona, 2006
BC	Enciclopedia de la fontanería Barcelona : CEAC, 2002- [Conté: 1. Materiales, elementos e instalaciones -- 2. Cálculos, trabajos y reparación de averías]
BC	Jiménez López, Luis. Instalaciones hidrosanitarias / Luis Jiménez López Barcelona : Ceac, D. L. 2008
BC	Jutglar, Lluís. Energía solar / Lluís Jutglar. - 1ª edc Barcelona : Ceac, [2004]
BC	Jutglar, Lluís. Manual de calefacción / Luis Jutglar, Ángel Luis Miranda, Miguel Villarubia. - 1ª ed. Barcelona : Marcombo, 2011
BC	Llorens, Martín. Calefacción / Martín Llorens; con la colaboración de Alfred Fontanals y Carlos Ruiz . - [Ed. rev. y act.] Barcelona : Ediciones Ceac, D.L. 2002
BC	Martín Sánchez, Franco. Nuevo manual de instalaciones de fontanería y saneamiento :adaptado al Código Técnico de la Edificación / Franco Martín Sánchez. - 3a ed Madrid : A. Madrid Vicente, 2008
BC	Ortega Rodríguez, Mario. Calefacción y refrescamiento por superficies radiantes / Mario Ortega Rodríguez, Antonio Ortega Rodríguez. - 1 edc Madrid [etc.] : Paraninfo : Thompson Learning, cop. 2001
BC	Pereda Suquet, Pilar. Proyecto y cálculo de instalaciones solares térmicas / Pilar Pereda Susquet. - 1ª edc Madrid : Fundación COAM, 2006
BC	Reglamentos de suministro y evacuación de agua :según los apartados HS4 y HS5 del CTE, código técnico de la edificación Barcelona : Marcombo, 2008
BC	Soriano Rull, Albert. Instalaciones de fontanería domésticas y comerciales :[Adaptado al nuevo Código Técnico de la Edificación CTE-2006] / Albert Soriano Rull. - 1ª edc Barcelona : Marcombo : Editorial UOC, 2006

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LISTADO DE URLs:

Código Técnico de la Edificación.
Documento Básico Ahorro de energía -
[http://www.codigotecnico.org/cte/export/sites/default/web/galerias/archivos/DB_H
Documento Básico HS. Salubridad. -
[http://www.codigotecnico.org/cte/export/sites/default/web/galerias/archivos/DB_H
Guía Práctica sobre instalaciones
centrales de calefacción y agua caliente
sanitaria en edificios de viviendas -
[http://www.idae.es/uploads/documentos/documentos_11081_Guia_instal_central
Guía práctica sobre instalaciones
individuales de calefacción y agua caliente
sanitaria en edificios de viviendas. -
[http://www.idae.es/uploads/documentos/documentos_11821_GPInstalIndividuale
Guía Técnica Agua Caliente Sanitaria
Central -
[http://www.idae.es/uploads/documentos/documentos_08_Guia_tecnica_agua_ca
IDAE. Instituto para la diversificación y
ahorro de la energía. -
[http://www.idae.es/index.php/relcategoria.1030/id.430/relmenu.347/mod.pags/me
Manual técnico de sistemas de fontaneria
y calefacción Uponor. -
[http://www.uponor.es/~/media/Files/Uponor/Spain/Manuales%20Tecnicos/Manua

Resources

Material	Support
Theory of the syllabus Schedule slides Case Studies Paper / Digital	Papel/Digital
Technical manuals, regulations and regulations. Paper / Repository	Paper / Repository Digital/Moodle