



DEGREE CURRICULUM  
**BUILDING SERVICES 2**

Coordination: PIQUE PALACIN, JOSE

Academic year 2023-24

## Subject's general information

<b>Subject name</b>	BUILDING SERVICES 2			
<b>Code</b>	101419			
<b>Semester</b>	1st Q(SEMESTER) CONTINUED EVALUATION			
<b>Typology</b>	Degree	Course	Character	Modality
	Bachelor's Degree in Architectural Technology and Building Construction	2	COMPULSORY	Attendance-based
<b>Course number of credits (ECTS)</b>	6			
<b>Type of activity, credits, and groups</b>	<b>Activity type</b>	PRAULA	TEORIA	
	<b>Number of credits</b>	3	3	
	<b>Number of groups</b>	1	1	
<b>Coordination</b>	PIQUE PALACIN, JOSE			
<b>Department</b>	INDUSTRIAL AND BUILDING ENGINEERING			
<b>Teaching load distribution between lectures and independent student work</b>	40% face-to-face, 60% autonomous work. See the section "Development plan for the subject"			
<b>Important information on data processing</b>	Consult <a href="#">this link</a> for more information.			
<b>Language</b>	Catalan			

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
PIQUE PALACIN, JOSE	jose.pique@udl.cat	6	

## Subject's extra information

Subject of practical nature that requires continuous work throughout the semester. It advises to work the concepts and amplitude of thought. Develop the regulatory scope and calculation of facilities.

Complements the basic facilities of a building developed in the first course, in this course works the air conditioning, fires and combustible gases

The information of the subject is posted in the Virtual Campus space.

Subject that is taken in the 1st semester of the 2nd year of teaching. It belongs to the module "Compulsory Matters".

## SAFETY AND HEALTH RULES FOR VISITS

It is **COMPULSORY** that the students bring the following elements of individual protection (EPI) in the work visit .

**Security helmet.** Acquire in ÚDELS, shop of the UdL, C / Jaume II, 67 bajos. Center of Cultures and Cross-Border Cooperation.  
<https://www.publicacions.udl.cat/en/product-category/udels-udl-products/>

**Reflective vest.** Acquire in ÚDELS, shop of the UdL, C / Jaume II, 67 bajos. Center of Cultures and Cross-Border Cooperation.  
<https://www.publicacions.udl.cat/en/product-category/udels-udl-products/>

**Safety footwear.** Acquire in any supplier of personal protective equipment, and must meet the requirements S1 + P (tip and anti-perforation template) in accordance with the provisions of EN ISO 20345.

Not bringing the EPI's described or not fulfilling the norms of general security that are detailed below imply that the student can not access the work or have to leave the same. The no realisation of the practices for this reason imply the **consequences in the evaluation** of the subject that are described in this course guide.

## GENERAL NORMS OF SECURITY IN THE EXIT TO WORK

- Keep the visiting place clean and orderly.
- In the visit you can not go with shorts or short skirts.
- Wear safety shoes.
- Do not eat or drink inside the work.
- Smoking is prohibited inside the work.
- Wash your hands whenever you have contact with a chemical and before leaving the work.
- Follow the instructions of the teacher and the technicians of the work and consult any doubt about safety.

For further information, you can check the following document of the *Servei de Prevenció de Riscos Laborals de la UdL*: <http://www.prevencio.udl.cat/export/sites/Sprl/ca/galleries/Integracio-a-la-Docencia/manual-acollida-alumnes-udl.pdf>

## SPECIFIC SAFETY RULES ON THE EXIT TO WORK

- Previously, the responsible professor will contact the Safety Coordinator of the work, who will establish the specific conditions of the visit. These instructions, which will inform the teacher before the visit, must be assumed and fulfilled by all attendees.
- The visit will be made at all times accompanied by the technicians of the work and the teacher and in no time the established route will be abandoned.
- Always look where you walk. In case of stop at any point of the work, take into account the passage of trucks, trucks, cranes ...
- Pay attention to preventive signage

## Learning objectives

- Be able to imagine the installation and its distribution, make sketches and their corresponding plans
- Apply the regulations in the facilities and the different verification processes before they are put into service
- Know the distribution and elements that make up the different facilities
- Describe the general parameters of the affected facilities.
- Relate the facilities of first and second year of teaching.
- Calculate facilities in a basic way.
- Analyze the results obtained and their magnitudes. Logical and coherent results.
- Promote group work (as in a professional office) and communication.
- Discover pros and cons in the design of the facilities.
- Know the field work of different professionals (technical architects ...) in the visit of a construction site.

## Competences

### Strategic competences UdL

- UdL3. Command of the TIC.

### Transversal competences EPS

- EPS7. Capacity to work in situations of fault of information and / or under pressure.
- EPS8. Capacity of planning and organisation of the personal work.

### Specific competences according to ORDER ECI/3855/2007:

- GEE21. Ability to apply technical regulations to the building process, and generate technical specification documents of procedures and construction methods of buildings.
- GEE22. Ability to apply the specific regulations on installations to the building process.
- GEE23. Aptitude for the pre-dimensioning, design, calculation and verification of structures and to direct their material execution.
- GEE24. Ability to constructively develop the building installations, control and plan their execution and verify the service and reception tests, as well as their maintenance.

## Subject contents

### Chapter 1 and 2: Air conditioning (decomposed in heating, cooling and hot water)

- Normative
- Introduction
- Heating
  - Elements or components of the system
    - Type of heat generators
    - Primary energies
    - Elements to consider in heating systems
      - Boilers
      - Fireplaces
      - Pipelines
      - Issuers
      - Accessories Control and energy
  - Saving Installation systems
    - Considering the type of heat generators and / or hot water
      - Autonomous
      - Heating systems and / or hot water
    - Considering the distribution
      - Heating by hot water
      - Heating by air
      - Electric heating
- Refrigeration
  - Elements or components of the system
    - Type of cold or cold / heat generators
    - Ventilation
    - Elements to consider in refrigeration systems
  - Installation systems
    - Considering the type of fluid transported by the cold or cold / heat in the spaces to be conditioned
    - Examples Mixed Installations
  - Yields
    - Inverter
    - COP / EER (SCOP / SEER)
- Sanitary hot water installation
- Psychrometric diagram

### Chapter 3: Fire fighting

- Introduction
- Fire detection elements
  - Smoke detectors
  - Thermal detectors

- Flame detectors
- Hydraulic installations
  - Rush
  - Fire hydrants
  - Hydrants
  - Dry columns
  - Sprinklers
  - Water spray
- Gas systems
- Foam systems
- Symbolology

## Chapter 4: Combustible gases

- Normative
- Properties of combustible gases
- Definitions and terminology
- Schematic type of facilities
- Sealing tests
- Installation conditions for pipes
- Installation conditions for the elements
- Gas meters
- Type of gas appliances
- Configuration of premises
- Configuration of ventilation spaces
- Watertight circuit devices
- Connection of gas appliances

## Methodology

The methodology of the subject is developed with:

- **Master classes.** Explanations and Power Point presentations in the classroom
- **Problem classes.** Exercises will be solved during these practical classes
- **Work in group.** During the course, students must do a common work in a group which will be directed by the lecturer in order that the minimum goals are achieved. The work will be presented and defended in class.
- **Exam.** Two written tests, theory and practice, are carried out during the semester. There is also a final recovery test.

## Development plan

Week	Topics	Attendance Hours	Self-employed hours
1	Subject presentation	2	-
2	T1. Air conditioning Heating (theory)	2	3
2	T1. Air conditioning Heating (problems)	2	3
3	T1. Air conditioning Heating (theory)	2	3
3	T1. Air conditioning Heating (problems)	2	3
4	T1. Air conditioning Heating (theory)	2	3
4	T1. Air conditioning Heating (problems)	2	3
5	T1. Air conditioning Cooling (theory)	2	3
5	T1. Air conditioning Cooling (problems)	2	3
6	T1. Air conditioning Cooling (theory)	2	3
6	T1. Air conditioning Cooling (problems)	2	3
7	T1. Air conditioning Cooling (theory)	2	3
7	T1. Air conditioning Cooling and hot water (theory - problems)	2	3
8	Presentation of group work at class: Heating and Cooling Other previous topics	4	12
9	Mid-term exams	3	
10	T2. Fire protection (theory)	2	3
10	T2. Fire protection (problems)	2	3

Week	Topics	Attendance Hours	Self-employed hours
11	T2. Fire protection (theory)	2	3
11	T2. Fire protection (problems)	2	3
12	Visit construction site	4	6
13	T3. Gas (theory)	2	3
13	T3. Gas (problems)	2	3
14	T3. Gas (theory)	2	3
14	T3. Gas (problems)	2	3
15	Presentation of group work at class: Fire protection and Gas Other previous topics	4	12
16-17	Segond-term exams	3	
19	Retrieval exams	3	

## Evaluation

### CONTINUOUS assessment

Evaluation blocks	%	Activities	%	Observations
Proof of Theory 1 - PT1	15%	PrProof of Theory 1 - PT1	15%	To take PT1 into account and consider the average, a minimum score of 4 (out of 10)
Proof of exercises - EX1	20%	Proof of exercises - EX1	20%	To take EX1 into account and consider the average, a minimum score of 4 (out of 10)
Proof of Theory 2 - PT2	15%	Proof of Theory 2 - PT2	15%	To take PT2 into account and consider the average, a minimum score of 4 (out of 10)
Proof of exercises - EX2	20%	Proof of exercises - EX2	20%	To take EX2 into account and consider the average, a minimum score of 4 (out of 10))
Work-T Site visit-V	30%	Work-T  Site visit-V	25%  5%	Minimum note of the blog a 5 (out of 10) Each of the four sections of work (heating - cooling, gas, fire protection) has a 5% weight. The presentation weighs 2.5% and the answers to questions from their classmates another 2.5%.  The visit tea weighs 5%

### Notes:

- Not reaching the minimum grade of 4 in any of the four blocks PT1 - EX1 - PT2 - EX2 and not reaching the minimum grade of 5 in blocks T and V implies failing the subject.
- In the rest of the situations, the final mark for the subject comes from the note with its percentage assessment of each of the blocks and this overall, it is necessary, to pass the subject, that it be higher than 5.
  - The particular case that the average of the grades is greater than 5, with any of the blocks without the minimum grade, implies a grade of 4.9 (suspended).
  - In the event that the average of the grades is not greater than 5, with any of the blocks without the minimum grade, the grade will be the lowest of the grade of the blocks.
- All activities are recoverable.

### ALTERNATIVE Assessment

- Written test of Theory and Exercises, similar to those of continuous evaluation with a weight of 70% (with minimum marks of 4 in each one of the blocks) of the final mark and work of the 4 sections with 30% of the final mark (with a minimum grade of 5).
  - The above notes apply.

## Bibliography

### Recommended bibliography

- Reglamento de Distribución y Utilización de Combustibles Gaseosos. Legislación Nacional. Real Decreto 919/2006, de 28 de julio, por el que se aprueba el Reglamento técnico de distribución y utilización de combustibles gaseosos y sus instrucciones técnicas complementarias ICG 01 a 11. (BOE 04.09.06) Notas para una correcta interpretación del R.D. 919/2006.
  - Descarga libre (<https://industria.gob.es/Calidad-Industrial/seguridadindustrial/instalacionesindustriales/instalaciones-combustibles-gaseosos/Paginas/reglamento-distribucion-utilizacion-combustibles-gaseosos.aspx>)
- Diseño y cálculo de instalaciones de gas. Antonio Manuel Romero Sedo (Autor) y Paloma Arrue Burillo (Autor). Editor: Prentice Hall. Edición: 1 (1 de julio

- de 2007). Idioma: Español. ISBN-10: 8483223627. ISBN-13: 978-8483223628
- Guía Instalaciones de Gas 09 Manual Técnico. Financiado por: Organizado por: Federación Empresarial Metalúrgica Valenciana. José Landete Morató (Autor) y Miguel Enguidanos Jávega (Autor).
    - Descarga libre (<http://nol.infocentre.es/ictnol/pdf/manual%20de%20instalaciones%20receptoras%20gas%20natural.pdf>)
  - El Código Técnico de la Edificación (CTE) es el marco normativo que establece las exigencias que deben cumplir los edificios en relación con los requisitos básicos de seguridad y habitabilidad establecidos en la Ley 38/1999 de 5 de noviembre, de Ordenación de la Edificación (LOE). REAL DECRETO 314/2006, de 17 de marzo, por el que se aprueba el Código Técnico de la Edificación.
    - CTE-DB-SI tiene por objeto establecer reglas y procedimientos que permiten cumplir las exigencias básicas de seguridad en caso de incendio.
    - Descarga libre (<https://www.codigotecnico.org/index.php/menu-seguridad-caso-incendio.html>)
  - Seguridad en caso de incendio para diseñadores de edificios. Roberto Alonso González Lezcano (Autor), Juan Bautista Echevarría Trueba (Autor) y Susana Hormigos Jiménez (Autor). Editorial: Ediciones Asimétricas. Idioma: Castellano. ISBN: 9788494430039. Año de edición: 2016.
  - Instalaciones de climatización y ventilación en el diseño de edificios - VV. AA. [Edición Bilingüe]. Roberto Alonso Gonzalez Lezcano (Autor), Juan Bautista Echeverria Trueba (Autor), Susana Hormigos Jimenez (Autor) y Maria Jesús Montero Burgos (Autor). Editor: Ediciones Asimétricas; Edición: 1 (4 de septiembre de 2017). Colección: ARQUITECTURA. Idioma: Español, Inglés. ISBN-10: 8494695746. ISBN-13: 978-8494695742
  - Reglamento de Instalaciones térmicas en los edificios. Real Decreto 1027/2007 de 20 de Julio. Ver versión consolidada.
    - Descarga libre (<https://energia.gob.es/desarrollo/EficienciaEnergetica/RITE/Paginas/InstalacionesTermicas.aspx>)
  - Publicaciones del IDAE Instituto para la diversificación y ahorro de energía.
    - Descarga libre (<https://www.idae.es/>)