

Course Unit	Building Technology II	Field of study	Technology and Construction Materials		
Bachelor in	Civil Engineering	School	School of Technology and Management		
Academic Year	2023/2024	Year of study	3	Level	1-3
Type	Semestral	Semester	1	ECTS credits	6.0
Code	9089-322-3103-00-23				
Workload (hours)	162	Contact hours	T 15	TP 45	PL -
			TC -	S -	E -
			OT -	O -	

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s) Maria Isabel Lopes Marcelino Dias de Abreu

### Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:

1. Understand the mechanisms of raising damp and rain penetration in buildings elements and know how to design for best practice in waterproofing.
2. Design rain water and underground drainage systems for single house buildings;
3. Design supply water, wastewater systems for single house buildings;
4. Understand the mechanisms of raising damp and rain penetration in buildings elements and know how to design for best practice in waterproofing and water drainage.
5. Design sound absorption systems. and sound insulation systems for residential buildings applying the regulations;
6. Design the passive and active systems for fire protection and safety of single house buildings;

### Prerequisites

Not applicable

### Course contents

Building acoustics; Building water supply and wastewater systems; Building fire protection and safety; Waterproofing and rain and soil water drainage systems for buildings.

### Course contents (extended version)

1. Building acoustics.
  - Sound characteristics; Pressure, intensity and acoustic power; Sound propagation in air.
  - Sound levels; Spectral analysis; The human ear specificity.
  - Room acoustic; Reverberation time; Acoustic sound absorption; Building acoustic absorption systems.
  - Airborne sound insulation; Sound insulation parameters; Building solutions.
  - Impact sound transmission; Sound insulation parameters; Building solutions.
  - Regulations on noise control.
2. Building water supply and wastewater systems.
  - Water supply and domestic hot water systems. (DHW).
  - Wastewater drainage systems.
3. Building fire protection and safety.
  - Basic principles about fires and life safe; Combustibles and combustion reaction - fire tetrahedron.
  - Fires type classification; Combustion products; Evolution of a fire.
  - Calorific power and fire load; Fire spread mechanisms. Processes of fire suppression
  - Building materials reaction to fire.
  - Fire resistance.
  - Fire codes – methodology; Building design for fire protection.
  - Passive fire protection systems. Building materials and constructive elements.
  - Active fire protection systems; Piping and extinguishers; Signaling and emergency illumination.
4. Waterproofing and rain and soil water drainage systems for buildings.
  - Water movement mechanism; Effects of dampness.
  - Construction moisture and drying out.
  - Rain penetration.
  - Raising damp and groundwater movement.
  - Design solutions for waterproofing.
  - Rain water drainage systems.
  - Groundwater drainage.

### Recommended reading

1. REGULAMENTO GERAL SOBRE O RUÍDO - D. L. nº 9/2007, de 17 de Janeiro, D. L. nº96/2008 de 9 de Junho e Declaração de Rectificação nº18/2007.
2. PATRÍCIO, Jorge, (2003) Acústica nos Edifícios, Jorge Patrício, Lisboa.
3. PEDROSO, Vitor M. R. (2000) Manual dos Sistemas Prediais de Distribuição e Drenagem de Águas, LNEC, Lisboa.
4. REGULAMENTO DE SEGURANÇA CONTRA INCÊNDIO, Decreto-Lei n.º 220/2008 de 12 de Novembro e Portaria n.º 1532/2008 de 29 de Dezembro.
5. LÓPEZ, Luis J. (2003) Humidades en la construcción, Monografías de la Construcción, Ediciones Ceac, Barcelona.

### Teaching and learning methods

Contact Hours: Lectures; Practical exercises; Video analysis and discussion; Analysis of technical documents; Concept maps and Work groups with discussion. Non-contact hours: Self-guided learning oriented by the teacher; Project based learning (PBL) Practical works based on an real building architectural project.

### Assessment methods

- Alternative 1 - (Regular, Student Worker) (Final, Supplementary, Special)
  - Final Written Exam - 30% (3 values in 20 of minimum in the theoretical part or in the practical part of the written exam.)
  - Practical Work - 70% (They aim to assess the acquisition of practical learning outcomes not included in written exam.)

### Language of instruction

Portuguese, with additional English support for foreign students.

## Electronic validation

Maria Isabel Lopes Marcelino Dias de Abreu	Flora Cristina Meireles Silva	António Miguel Verdelho Paula	José Carlos Rufino Amaro
10-10-2023	10-10-2023	10-10-2023	20-10-2023