Course Unit	Quality, Safety and Sustainability in Construction			Field of study	Construction Management and Legislation		
Bachelor in	Civil Engineering			School	School of Technology and Management		
Academic Year	2022/2023	Year of study	3	Level	1-3	ECTS credits	6.0
Type	Semestral	Semester	1	Code	9089-322-3105-00-22		

Workload (hours)	162	Contact hours	T	-	TP	60	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): Jorge Pedro Lopes, Rui Alexandre Figueiredo de Oliveira, Sílvia Maria Afonso Fernandes

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:
1. Know the legislation applied to health, hygiene and safety on construction site. (S)
2. Apply risk analysis and methods of risk assessment, and implement preventive and management measures in construction works. (S)
3. Know the rules for the implementation of the safety management system and respective specifications. (S)
4. Demonstrate knowledge of the Portuguese Quality System. (Q)
5. Interpret quality standards and identify the regulatory requirements related to construction products. (Q)
6. Demonstrate knowledge of quality control of construction products and construction processes. (Q)
7. Know the sustainability and sustainable construction concepts and identify methods and practices of Environmental Impact Assessment. (E)
8. Understand the legislation and international standards associated with the environment, particularly those related with the construction industry. Elaborate waste prevention and management plans. (E)

Prerequisites

Before the course unit the learner is expected to be able to:
1. Demonstrate knowledge of basic statistics
2. Demonstrate knowledge of construction methods and construction technologies
3. Demonstrate basic knowledge of English

Course contents

S: Safety at workplace; Personal and collective protection equipment; Analysis and assessment of risk; Check-lists; Safety management systems; Q: Quality in Construction. The Portuguese Quality System; The ISO 9000 family of standards; Product certification and CE Marking. Quality control. E: Environmental challenges; Sustainable development and sustainable construção. Environmental impact assessment; The Waste Framework Directive; Construction and demolition waste management..

Course contents (extended version)

1. Safety at the workplace
   - Legislation and Directives related to Safety, Hygiene and Health at work
2. Analysis and assessment of risks
   - Difference between hazard and risk
   - Methodologies of risk analysis
   - Methods of risk assessment
   - Hierarchy of risks
3. Personal and collective protection equipment
   - Legislation applied to safety
   - Personal protection equipment
   - Collective protection equipment
   - Methodologies for selecting personal and collective protection equipment
4. Safety Coordination
   - Legislation - decree-law 273/2003
   - Role and responsibilities of the Safety Coordinator at design and execution phases
   - The Safety and Health Plan: objectives, structure, phases of development and legal obligations.
5. Analysis of hazards and risks in construction works
   - Demolitions
   - Construction site layout
   - Ready-made concrete plane; crane
   - Electrical installations, water and sewage installations, telephone installations
   - Reinforced concrete works, roof works, terraces, balconies, confined spaces
   - High-rise works, scaffolding
   - Excavations, underground works
   - Small portable tools
   - Manual handling of loads, explosives
   - Roadworks and railway works
6. Checklists for safety in construction works
   - Checklists for monitoring construction works and construction equipment
7. Safety management system
   - Occupational health and safety management systems. OHSAS 18001 Standard (NP 4397)
8. Introduction to Quality
   - Quality in the construction industrY
   - Historical evolution of Quality
   - The quality as a strategic area of construction management
   - The relationship between marketing and quality
9. The Portuguese Quality System
10. ISO 9000 family of Standards
    - NP EN ISO 9000 - Quality management systems - Fundamentals and vocabulary
    - NP EN ISO 9001 - Quality management systems — Requirements
    - NP EN ISO 9004 - Quality management systems – Guidelines for performance improvement
11. Products certification and CE marking
12. Quality control and implementation
    - Organizational structures
    - The actors and their responsibilities
    - Interpretation of main documents
    - Quality management techniques
    - Project design quality assessment
13. Environmental challenges in the construction industry
    - Construction and the environment

Course contents (extended version)

- Sustainable development and sustainable construction
- Construction and Demolition Waste (CDW). Waste prevention and management plan
- CDW: Collection, sorting and transport of waste

14. Environmental Management
    - Legislation applied to the environment
    - ISO14000 familily of Standards
15. Environmental Assessment
    - Legal Regime of the Environmental Impact Assessment
    - Environmental impact assessment

Recommended reading

1. Normas e legislação nacional e comunitária aplicadas à temática de Qualidade, Segurança e Ambiente.
2. Pinto, Abel; Manual de Segurança: Construção, Conservação e Restauro de Edifícios, 2ªed. , Edições Sílabo, Lisboa, 2005.
3. Juran, J. M. , Godfrey, A. B. (1998) - Quality Handbook , McGraw-Hill.
4. CIB Agenda 21 on Sustainabe Construction-CIB Report Publication 237
5. Decreto-lei nº 102 D/2020- Regime Geral de Gestão de Resíduos

Teaching and learning methods

The course unit will be taught through a combination of lectures, practical classes aimed at the resolution of practical exercises and development of individual/group works.

Assessment methods

1. Alternative 1 - (Regular, Student Worker) (Final)
    - Practical Work - 100% (Practical works covering 3 different parts of the course contents. Discussion of the works)
2. Alternative - (Regular, Student Worker) (Final, Supplementary, Special)
    - Final Written Exam - 100%

Language of instruction

1. Portuguese
2. English

Electronic validation

Jorge Pedro Lopes	António Miguel Verdelho Paula	Paulo Alexandre Vara Alves
05-10-2022	11-10-2022	04-11-2022