School of Agriculture
Course Unit Syllabus

Level of qualification:
Short cycle (TESP)
Study cycle:
Environmental Protection Systems

Course Unit: **223517** – **Treatment of Gaseous Effluents**

Year 2 **Semester 3** **ISCED Code: 712** **ECTS: 5.0**

Tipe of Course Unit: Compulsory **Delivery Mode:** Face-to-face **Language of Instruction:** Portuguese

COURSE COORDINATOR: Maria Teresa Borralho Marques dos Carvalhos

HOURS OF WORK

TOTAL HOURS	Contact Hours								Hours in autonomous work
	Theory	Theory and practice	Practical and laboratory work	Field work	Seminar	Internship	Tutorial guidance	Other	
125		**10**	**45**						**70**

Prerequisites (if applicable): Not applicable

LEARNING OUTCOMES (knowledge, skills and competence)

Comprehensive knowledge and understanding of gaseous effluent treatment technologies. Ability to select and control technologies for treatment of gaseous effluents and control of indoor and outdoor air pollution. Ability to prepare compliance reports in accordance with applicable legislation.

CONTENTS

Characterization of emissions: industrial, mobile and natural; methods of continuous and manual sampling in industrial sources: measurement of gaseous pollutants in fixed sources; methods of sampling and measurement of pollutants in mobile sources. Principles of particle separation. Cyclonic separators. Principles of separation. Operational variables. Electrostatic precipitators. Principles of separation. Operational variables. Dry filtration. Principles of separation. Operational variables. Gas-liquid absorption. Principles of separation. Examples of applications. Gas-solid adsorption. Examples of applications. The adsorbents. Gas-solid contact models. Scrubers. Principles of separation .. Incineration. Application examples. Safety and limits of explosion. Biological techniques of treatment of gaseous effluents. Biofilms. Applications. Operating conditions.Reference to specific separation processes: desulphurization, denitrification, removal of organic micropollutants and heavy metals

DEMONSTRATION OF THE CONTENTS COHERENCE WITH THE COURSE UNIT'S LEARNING OUTCOMES

This course unit is intended to provide students with information about the processes and technologies used in the treatment and control of air quality, so that the program contents were selected with this objective in mind, addressing the theoretical and practical issues of the technologies available to them characteristics and operating principles, thereby helping to identify and characterize the need for air treatment and to act on its management in the light of applicable legislation.

TEACHING METHODOLOGIES

Expository and demonstrative methods (with video viewing, study visit) and group work.

DEMONSTRATION OF THE COHERENCE BETWEEN THE TEACHING METHODOLOGIES AND THE LEARNING OUTCOMES

The methodology addresses the fundamental concepts of the principles and operation of air treatment technologies; with the demonstrative methodology, it is promoted the learning through videos and study visits and thus contributes to the identification and characterization of the different treatments, allowing to stimulate the capacity to select them in specific situations. The group work solves practical questions that allow solving problems under the guidance of the teacher.

EVALUATION METHODS

Final written examination.

MAIN BIBLIOGRAPHY

Some elements of study will be made available on the UC elearning page (Moodle),

“Poluição Atmosférica – Um manual recomendado” 1ª Edição João Gomes, Setembro 2001

-“Atmospheric Change-An Earth System Perspective” T.E. GRADEL e Paul J. CRUTZEN, 3ª edição 1997

-“Atmospheric Chemistry and Physics of AIR POLLUTION” Jonh H. Seinfeld, 1986

Year of implementation: 2016/2017 | Date of approval by the Technical-Scientific Board: