VNIVERSITAT DE VALÈNCIA

Course Guide
43810 Control of air pollution

COURSE DATA

Data Subject	
Code	43810
Name	Control of air pollution
Cycle	Master's degree
ECTS Credits	6.0
Academic year	2023 - 2024

Study (s)

Degree	Center	Acad. year	Period
2227 - M.U. en Ingeniería Ambiental	School of Engineering	1	Second term
2250 - M.D. in Environmental Engineering	School of Engineering	1	Second term

Subject-matter

Degree	Subject-matter	Character
2227 - M.U. en Ingeniería Ambiental	3 - Treatment of land, waste and air emissions	Obligatory
2250 - M.D. in Environmental Engineering	15 - Control de la contaminación atmosférica	Obligatory

Coordination

Name	Department
GABALDON GARCIA, M CARMEN	245 - Chemical Engineering

SUMMARY

Air Pollution Control (6.0 ECTS) is teaching during second term of the Master of Environmental Engineering. The aim of this practical subject is the design and operation of equipment for air pollution control.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

Previous courses on: Assessment of environmental quality; Transport of pollutants in the environment; Analysis and application of environmental legislation is recommended.

OUTCOMES

2227 - M.U. en Ingeniería Ambiental

- Students should apply acquired knowledge to solve problems in unfamiliar contexts within their field of study, including multidisciplinary scenarios.
- Students should be able to integrate knowledge and address the complexity of making informed judgments based on incomplete or limited information, including reflections on the social and ethical responsibilities associated with the application of their knowledge and judgments.
- Students should communicate conclusions and underlying knowledge clearly and unambiguously to both specialized and non-specialized audiences.
- Students should demonstrate self-directed learning skills for continued academic growth.
- Students should possess and understand foundational knowledge that enables original thinking and research in the field.
- Identify and apply technologies, tools and techniques in the field of environmental engineering.
- Assume with responsibility and ethics the Environmental Engineer role in a professional context.
- Promote and apply the principles of sustainability.
- Adapt to changes, being able to apply the principles of Environmental Engineering to unknown cases and use new and advanced technologies and other relevant developments, with initiative and entrepreneurial spirit.
- Identify, declare and entirely analyze environmental problems.
- Assess the application of measures for the pollution prevention and the recovery, protection and improvement of environmental quality.
- Design and calculate engineering solutions to environmental problems, comparing and selecting technical alternatives and identifying emerging technologies.
- Understand and apply environmental national and international legislation, adapting environmental solutions to these regulations.
- Apply standard methodologies for the analysis and evaluation of environmental risks.
- Evaluate the environmental quality of the air from a global point of view, especially when there is a risk to public health.

- Be able to characterize the emissions to air, coming from the anthropogenic activity.
- Evaluate the treatment of emissions to the atmosphere to assess different alternatives and obtain the required information for the design of the selected treatment processes.
- Design and manage wastewater treatment and treatment systems for atmospheric emissions.

2250 - M.D. in Environmental Engineering

- Students should apply acquired knowledge to solve problems in unfamiliar contexts within their field of study, including multidisciplinary scenarios.
- Students should be able to integrate knowledge and address the complexity of making informed judgments based on incomplete or limited information, including reflections on the social and ethical responsibilities associated with the application of their knowledge and judgments.
- Students should communicate conclusions and underlying knowledge clearly and unambiguously to both specialized and non-specialized audiences.
- Students should demonstrate self-directed learning skills for continued academic growth.
- Students should possess and understand foundational knowledge that enables original thinking and research in the field.
- Identify, formulate and solve complex environmental engineering problems by applying engineering, scientific and mathematical principles.
- Apply environmental engineering designs to produce solutions that meet specific needs addressing public health, safety and welfare taking account of global, cultural, social, environmental and economic factors.
- Recognise the ethical and professional responsibilities of environmental engineering and make informed judgements considering the impact of engineering solutions in global, economic, environmental and social contexts.
- Learn and apply new knowledge, using appropriate learning strategies.
- Carry out a comprehensive assessment of environmental air quality.
- Characterise emissions to air.
- Implement measures for preventing pollution and recovering, protecting and improving environmental quality.
- Design, calculate and select engineering solutions to environmental problems, comparing alternatives that include emerging technologies under criteria of technical, social, economic and environmental viability.
- Manage and operate treatment and/or purification systems in the field of environmental engineering
- Interpret and apply national and international environmental legislation and adapt environmental solutions to these regulations.
- Develop environmental solutions under the principles of circular economy and the sustainable development goals.

LEARNING OUTCOMES

1. To know the strategies on pollution prevention and control of sources of air emissions.
2. To understand the technological demands in the field of air pollution control.
3. To select the best technological solution among the available options for a specific pollutant and case.
4. To be able of design and operate the established processes for air pollution control.
5. To ideate integrated installations for air pollution control.
6. To identify the novelty technological solutions in the field of air pollution control.

DESCRIPTION OF CONTENTS

1. Pollution prevention and control

Sources. Strategies on air pollution prevention and control. Environmental Regulations. General considerations in process design.

2. Particulate control

Sources of particles. Characteristics of particles. Process design and operation: cyclones, fabric filters, electrostatic precipitators and particulate scrubbers.

3. Control of gases (I)

Sulfur oxides. Nitrogen oxides. Greenhouse gases.

4. Control of gases (II)

Emisión de COVs. Técnicas de prevención: Cambios de producto. Modificación de proceso. Control de fugas. Control de emisiones: incineración, adsorción, condensación y biotratamiento. Fuentes de producción de olores. Eliminación de olores: lavado químico, biofiltración.

5. Specific problematics

Mobile sources. Indoor air quality.

WORKLOAD

ACTIVITY	Hours	% To be attended
Classroom practices	36,00	100
Theory classes	20,00	100
Other activities	4,00	100
Development of group work	10,00	0
Study and independent work	20,00	0
Preparation of evaluation activities	25,00	0
Preparing lectures	10,00	0
Preparation of practical classes and problem	15,00	0
Resolution of case studies	10,00	0
TOTAL	**150,00**	

TEACHING METHODOLOGY

Course lessons will cover theoretical and practical lessons (problems, questionnaires and practical cases).

Practical homework will include problems and practical cases.

Mentoring for specific questions will be also available.

EVALUATION

The assessment of student learning is performed by:

Continuous assessment: 30% practical deliverables, 20% questionnaires.

Exam covering theoretical and practical issues: 50%

The subject is passed when the total mark of the evaluation is equal to or greater than 5. The marks obtained in the exam must be equal to or greater than 4.5 out of 10. When the mark of the exam would be equal to or greater than 4.5 out 10, the final mark will be obtained as the maximum between: 1) the average rating of the continuous assessment and the exam and 2) the mark of the exam. When the mark of the exam would be lower than 4.5 out 10, the final mark will be obtained as the maximum between: 1) the average rating of the continuous assessment and the exam and 2) the mark of the exam.

Nevertheless, the assesment will follow the regulations established by the “Reglament de Avaluació i Qualificació de la Universitat de València per a títols de Grau i Màster” (http://links.uv.es/7S40pjF).

REFERENCES

Basic

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- Theodore, L. Air Pollution Control Equipment Calculations. John Wiley & Sons (2008). Texto completo en línea.

Additional

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- Davis, W.T. Air pollution engineering manual. 2º ed., John Wiley & Sons, New York (2000).
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- McKenna, J.D., Turner, J.H., McKenna Jr, J.P. Fine particle (2.5 microns) emissions: regulations, measurement and control. John Wiley & Sons (2008). Texto completo en línea.
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- Wang, K.L., Pereira, C., Hung, Y-T Air Pollution Control Engineering. Humana Press (2004).