

FICHA TÉCNICA DE LA ASIGNATURA

Datos de la asignatura	
Nombre completo	Air pollution and treatment
Código	DIM-MESEM-511
Impartido en	Máster Universitario en Ingeniería Industrial + Máster en Medioambiente y Transición Energética [Primer Curso] Máster en Medioambiente y Transición Energética /Master in Environment and Energy Transition [Primer Curso]
Nivel	Master
Cuatrimestre	Semestral
Créditos	3,0 ECTS
Carácter	Optativa
Departamento / Área	Departamento de Ingeniería Mecánica

Datos del profesorado	
Profesor	
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DATOS ESPECÍFICOS DE LA ASIGNATURA

Contextualización de la asignatura
<p>Aportación al perfil profesional de la titulación</p> <p>This subject aims to deepen the knowledge about air pollution, its consequences and remediation. The knowledge acquired in this subject is intended to serve as a basis for the professional career of an engineer in the field of environment and energy management.</p> <p>At the end of the course, the student will know the most common types of pollutants and how they disperse and evolve in the troposphere, their effects on the environment and population, the origin, as well as the most common remediation and treatment technologies.</p> <p>In addition, the training will be completed with a description of the current situation of the industry in terms of atmospheric emissions, and the main objective of decarbonization.</p>



Prerequisitos

Basic chemistry.

Basic knowledge of environmental engineering.

Competencias - Objetivos

Competencias

GENERAL

- Knowledge of basic and technological subjects, which enables them to learn new methods and theories, and gives them versatility to adapt to new situations.
- Ability to solve problems with initiative, decision-making, creativity, critical reasoning and to communicate and transmit knowledge, skills and abilities in the field of Industrial Engineering.

SPECIFIC

- Knowledge and skills for the application of environmental engineering.
- Knowledge of the fundamentals of science, technology and chemistry of pollutants. Understand the relationship between emission and effects on human health, as well as the form of dispersion.
- Knowledge of the current state of the industry and the main objectives in terms of air quality and decarbonization.

Resultados de Aprendizaje

- Know the different types of pollutants (both primary and secondary), their origin, effects and consequences on health and the environment.
- Know the process of dispersion of pollutants and the capacity of evolution of these in the troposphere.
- Know the different treatments of air pollution and the main objectives of indoor, outdoor and emission air quality.
- Know the different methods of measuring and monitoring pollution.
- Know the effects of climate change, its causes, consequences, current status and mitigation and adaptation measures.

BLOQUES TEMÁTICOS Y CONTENIDOS

Contenidos – Bloques Temáticos

Unit 1: Air pollution

- Classification and functions of the atmosphere.
- Air pollution.
- Episodes and accidents in air pollution during the twentieth century.
- Factors affecting the dispersion of air pollution.
- Chemistry and photochemistry of pollutants.
- Air pollution and COVID-19

Unit 2: Main pollutants and their effects

- Main air pollutants.
- Classification of air pollutants.
- EU directives on air quality.
- Effect of air pollutants.

Unit 3: Treatment of air pollution

- Polluting sources and processes.
- Air pollution control.
- Capture of air pollutants.
- Techniques for capturing air pollutants.

Unit 4: Pollution measurement

- Creation of a network for monitoring and forecasting air pollution.
- Immission measures.
- Methods of analysis of the samples collected.

Unit 5: Simulation of pollutants dispersion

- Fundamentals of dispersion calculation.
- Dispersion models.
- Pollutant dispersion software.

Unit 6: Climate change and decarbonisation

- Climate change: Causes, consequences, current status and adaptation measures.
- Objectives for climate change mitigation and adaptation.
- Decarbonization of the economy: Strategies and case studies.
- Carbon Footprint. Fundamentals and mitigation.

METODOLOGÍA DOCENTE

Aspectos metodológicos generales de la asignatura

CLASSROOM METHODOLOGY:



- Expository lesson: The teacher will explain the fundamental concepts. Students can participate by raising doubts or contributing the knowledge they have in this regard.
- Short questions at the beginning of the class: Whose purpose is to evaluate what students have learned in the previous classes.
- Seminars: Industry professionals will attend periodically to present their experience and knowledge in the determining topics of the subject.
- Realization of a practical project: To evaluate the practicality of the subject and the acquisition of knowledge by the students.

METHODOLOGY OUTSIDE THE CLASSROOM:

- Pre-reading of the study material on the topic that will be discussed in class. Study and assimilation of basic concepts.
- Carrying out practical projects, using office, graphic design and simulation tools, making the appropriate calculations, analyzing and justifying the results.

RESUMEN HORAS DE TRABAJO DEL ALUMNO

WORKING HOURS:

- Master class, presentations and seminars: 30.00 hours

NON-PRESENTIAL HOURS:

- Autonomous work on the contents: 40,00 hours
- Realization and development of the practical project: 20,00 hours

TOTAL HOURS: 90,00 hours (3 ECTS)

EVALUACIÓN Y CRITERIOS DE CALIFICACIÓN

CONTINUOUS ASSESSMENT EXAMS AT THE END OF EACH UNIT (40%)

- Understanding of concepts.
- Application of concepts to the resolution of practical cases.

PRACTICAL PROJECT (60%)

- Capacity and level of knowledge acquisition.
- Ability to write reports and analyze results and conclusions.

Calificaciones

ORDINARY EVALUATION

The grade of the subject in the ordinary evaluation will be composed of the weighted sum of:

- Continuous evaluation grade (40%). The minimum grade in the set of exams must be 4.00 to be able to make the weighted



average.

- Practical project grade (60%) The minimum grade of the project or practical work must be 5.00 to be able to make the weighted average.

In case of not meeting any of the minimum grade requirements (in the continuous evaluation or in the work or practical project), the student's final grade will be the lowest grade obtained, either in the continuous evaluation, or in the project or work.

EXTRAORDINARY EVALUATION

In extraordinary evaluation, the student will make that part that has failed or has not reached the minimum grade required. The grade of the part approved in ordinary call, will be maintained. The grade in extraordinary evaluation will result from the weighted sum of:

- Grade of the extraordinary exam (or ordinary if it is maintained) (40%) The minimum grade in this exam must be 5.00 to be able to make the weighted average.
- Grade of the practical project (extraordinary or ordinary if maintained) (60%) The minimum grade of said project or practical work must be 5.00 to be able to make the weighted average.

In case of not meeting any of the minimum grade requirements (in the final exam or in the work or practical project), the student's final grade will be the lowest grade obtained, either in the final exam, or in the project or practical work.

BIBLIOGRAFÍA Y RECURSOS

Bibliografía Básica

- Gallego Picó, Alejandra, y otros. *CONTAMINACIÓN ATMOSFÉRICA*. Ed. UNED (2012)
- Morales-Polo, Carlos. *Apuntes "Manual para la contaminación atmosférica"*
- IPCC. *Climate Change 2021. The physical Science Basis*. (2021)

Bibliografía Complementaria

- Aragón Revuelta, Pilar, y Catalá Icardo, Mónica. *PROBLEMAS DE CONTAMINACIÓN ATMOSFÉRICA*. Ed. UPV (2013).
- Seoáñez Calvo, Mariano. *TRATADO DE LA CONTAMINACIÓN ATMOSFÉRICA. PROBLEMAS, TRATAMIENTO Y GESTIÓN*. Ed. Mundi-Prensa (2002)