COURSE DATA

Data Subject	
Code	34777
Name	Air pollution engineering
Cycle	Grade
ECTS Credits	4.5
Academic year	2019 - 2020

Study (s)

Degree	Center	Acad. year	Period
1401 - Degree in Chemical Engineering	School of Engineering	4	Second term

Subject-matter

Degree	Subject-matter	Character
1401 - Degree in Chemical Engineering	23 - Optional subjects	Optional

Coordination

Name	Department
ALVAREZ HORNOS, FRANCISCO JAVIER	245 - Chemical Engineering

SUMMARY

The subject Air Pollution Engineering is an optative subject that is taught in the 4th course of the Degree in Chemical Engineering.

This subject consists of a total of 4.5 ECTS distributed among theoretical and practical classes. In the subject Air Pollution Engineering, the students will gain the knowledge to design and operate the air pollution control equipments in order to apply them at industrial scale.

Observations: The theory classes will be taught in Spanish and practical classes as stated in the course sheet available on the website of the degree.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

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

Other requirements

It is suggested to pass previously the next subjects in order to affront with guaranties the matter: Environment and sustainability and Environmental pollution engineering

OUTCOMES

1401 - Degree in Chemical Engineering

- O1 - More comprehensive skills than those acquired in compulsory subjects.

LEARNING OUTCOMES

- Understand the needs on the air pollution control field (Skill O1).

- Select the most appropriate technique among the different treatment systems in a specific problem of emissions of pollutants to air (Skill O1).

- Be able to design, run and operate the different technologies for treatment of air emissions (Skill O1).

- Describe the fundamentals associated to the movement of pollutants in the atmosphere (Skill O1).

- Be able to use the dispersion models of air pollution (Skill O1).

- Know the specialized bibliographic resources in order to find, select and understand the information (Skill O1).

- Evaluate critically the obtained results from the practical exercises (Skill O1).

DESCRIPTION OF CONTENTS

1. Air Pollution dispersion

Movement of pollutants in the atmosphere. Atmospheric stability. Air pollution dispersion models. Chimney design.

2. Particles removal

Particle sizing distribution. Terminal settling velocity. Dust extraction. Particle collection mechanisms. Collection equipment design and operation. Guideline to select equipment.

3. Removal of volatile organic compounds

Treatment equipment design and operation. Guideline to select equipment.

4. Removal of air emissions of inorganic compounds

Sulfur oxides and other acid gases. Nitrogen oxides. Treatment equipment design and operation. Guideline to select equipment.

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	25,00	100
Classroom practices	20,00	100
Development of individual work	3,00	0
Study and independent work	10,00	0
Readings supplementary material	2,50	0
Preparation of evaluation activities	10,00	0
Preparing lectures	15,00	0
Preparation of practical classes and problem	15,00	0
Resolution of case studies	12,00	0
TOTAL	**112,50**	

TEACHING METHODOLOGY

The methodology used in the course will consider the following aspects:

Lecture sessions: the professor will offer a global vision of the subject and will focus on the fundamentals and more difficult aspects, besides the resources that will be used throughout the sessions. Some practical applications will be formulated in order to enhance the assimilation of the introduced concepts. These sessions will be taught in a single group.

Practical lessons: in these sessions design and operations problems of control equipment will be carried out. Practical questions and typical problems will be solved in a regular classroom (40 student group). Also, resolution of problems will be proposed to the students who will individually solve.

(Skill O1).

EVALUATION

The assessment of student learning will be carried out following two models:

A) Through the assessment of activities undertaken by students and the note of the performed test.

B) From the note obtained in an examination to be held in the official date.

To choose the modality of evaluation A) the students must have attended 80% of the classes. The evaluation of the course will be calculated **as the maximum of**:

1) Weighted average of practice work (40%) and an objective test (60%):

- Practice work (40% of final grade, skill O1). It will be divided into:

Question lists (20% of final grade). Students will complete a series of questionnaires throughout the semester.

Resolution of design problems (20% of final grade). Students will be evaluated by the submission of several typical problems related to the design of any of the processes studied handed out during the practical lessons.

- Objective test (60% of final grade, minimal mark of 4, skill O1). Based on a written test with theoretical and practical questions. It is mandatory to obtain in the objective test a mark equal or greater than 4.0 (out of 10).

2) Mark of the objective test (minimal mark of 4, skill O1).

In modality B) the student will be examined on the date of the first call and the final mark will be obtained **as the maximum of**:

1) Weighting of the test (75% of final grade, minimal mark of 4) and the average score of the delivered activities (25% of final grade).

2) Mark of the final test (minimal mark of 4, skill O1).

In second call, the modality for evaluation will be B.

For both modalities, the course will be over passed when the weighted average mark is equal to or greater than 5 (out of 10), being mandatory to obtain in the objective test a mark equal or greater than 4 (out of 10). If the objective test mark is lower than 4, the final qualification will be the one obtained in the objective test.

In any case, the assessment system will be governed by that established in 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

- Theodore, L. Air pollution control equipment calculations. John Wiley & Sons (2007). (Texto completo en línea)
- Cooper, C.D., Alley, F.C. Air pollution control: a design approach. Waveland Press (2012).
- de Nevers, N. Ingeniería de Control de la Contaminación del Aire. McGraw-Hill Interamericana (1998).
- Wark, K., Warner, C.F., Davis, W.T. Air Pollution: its Origin and Control. Addison-Wesley (1997).
- Vallero, D.A. Fundamentals of air pollution. Elsevier (2008). (Texto completo en línea)

Additional

- Weiner, R.F., Peirce, J.J., Vesilind, P.A. Environmental Pollution and Control. Butterworth-Heinemann (1997). (Texto completo en línea)
- Boubel, R.W., Fox, D.L., Turner, D.B., Stern, A.C. Fundamentals of Air Pollution. Academic Press (1994).
- Wang, K.L., Pereira, C., Hung, Y.T. Air Pollution Control Engineering. Humana Press (2004).
- Davis, W.T. Air pollution engineering manual. John Wiley & Sons (2000).
- 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)
- Richard C. Flagan, John H. Seinfeld. Fundamentals of Air Pollution Engineering Dover Publications, (1988)

ADDENDUM COVID-19

This addendum will only be activated if the health situation requires so and with the prior agreement of the Governing Council

English version is not available