Equipment Design and Materials Resistance

Code: 102437
ECTS Credits: 6

2024/2025

Degree	Type	Year
2500897 Chemical Engineering	OB	3

Contact

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Teaching groups languages

You can view this information at the end of this document.

Prerequisites

Have obtained the knowledge of the subjects studied in previous years

Objectives and Contextualisation

Understand the resistance of materials, efforts and tensions that are generated.

Dimension beams and simple structures, according to the criteria of resistance and in accordance with the applicable regulations.

Study the deformation of the elastic.

Learn the basics of corrosion and degradation of materials, and their application to chemical plants.

Know the working parameters of pressure devices according to the regulations.

Expand the knowledge of unit operations that were appreciated in previous years to be able to define the plant services.

Introduce the aspects of regulations and safety in the design of industrial plants.

Competences

- Demonstrate knowledge and know how to use the principles of theory of circuits and electric machines
- Demonstrate knowledge of the standards, legislation and regulations applicable to each situation.
- Develop personal work habits.
- Objectively compare and select different technical options for chemical processes.

Learning Outcomes

1. Apply knowledge of theory of circuits and electric machines in the design of equipment and facilities
2. Develop independent learning strategies.

3. Discriminate the different options for the dimensioning of constructive elements.
4. Interpret the standards, legislation and regulations applicable to the design of systems.
5. Objectively contrast the different options in the design of processing equipment, installations and supporting structures.

Content

1.- Resistance of materials
2.- Sizing of fish
3.- Deformations
4.- Corrosion of materials
5.- Pressure devices
6.- Plant services
7.- Protection against explosions in indutrial environments

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Problem classes	15	0.6	3, 4, 5
Team working	10	0.4	1, 4, 5
Theoretical classes	20	0.8	3, 4, 5
Type: Supervised			
Tutorials	15	0.6	1, 3, 4, 5
Type: Autonomous			
Personal study	25	1	1, 3, 4, 5
Problem solving	30	1.2	3, 4, 5
Team working	30	1.2	1, 2, 3, 4, 5

Master classes i applied classes of problem solving

The students have to do a work on a topic related to the subject

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Activity A	15%	1	0.04	
Activity B	50%	2.5	0.1	3, 4, 5
Activity C	25%	1	0.04	1, 2, 3, 4, 5
Activity D	10%	0.5	0.02	4, 5

a) Process and scheduled evaluation activities

The course consists of the following evaluation activities:
- Activity A. Written test on the content of topics 1. The weight will be 15% of the final grade. This activity is not recoverable.
- Activity B. Written test on the content of topics 1, 2 and 3. The weight will be 50% of the final grade.
- Activity C. Work. Students must submit a written work that will have a weight of 25% on the final grade. This activity is not recoverable.
- Activity D. Submission of abstracts. The weight will be 10% on the final grade. This activity is not recoverable.

To pass the course, through continuous assessment, a minimum grade of 4 will be required in activity B.
The note will result from the following expression:
Final grade (continuous assessment) = Activity grade A * 0.15 + Activity grade B ($\geq$4) * 0.50 + Activity grade C * 0.25 + Activity grade D * 0.10
b) Scheduling of evaluation activities
The schedule of the evaluation activities will be communicated at the beginning of the course.
c) Recovery process
Students who have not passed the subject will be able to present themselves to the recovery of activity B, provided they have been presented to a set of activities that represent a minimum of two thirds of the total mark for the subject and have a average mark of all the activities of the subject higher than 3.
According to the coordination of the Degree and the management of the School of Engineering, Activity A, C and D are not recoverable.
The recovery note will result from the following expression:
Final grade = Activity grade A * 0.15 + Activity grade B ($\geq$4) * 0.50 + Activity grade C * 0.25 + Activity grade D * 0.10
Those students suspended for not having reached the minimum grade (in any of the activities) will have a maximum final grade of 4.
d) Qualification review procedure
For each assessment activity, there will be a review place, date and time where the student can review the activity with the teacher. In this context, it will be possible to make claims about the grade of the activity, which will be evaluated by the teacher responsible for the subject. If the student does not appear for the review, this activity will not be reviewed later.
e) Qualifications
With honors. Up to 5% MH of the total number of students enrolled can be awarded. It can only be awarded to students with a final grade equal to or greater than 9.5.
A student will be considered non-assessable if he / she has not submitted to any evaluation activity of the subject
f) Irregularities on the part of the student, copying and plagiarism
Without prejudice to other disciplinary measures deemed appropriate, the irregularities committed by the student that may lead to a change in the grade of an act of evaluation will be rated with zero. Therefore, copying, plagiarism, cheating, letting yourself be copied, etc. in any of the evaluation activities it will involve suspending it with a zero.
g) Evaluation of repeating students
Students who do not enroll for the first time in the course will have the option of taking the assessment activities during the course or the recovery activities at the end of the course.
The grade of the subject will correspond to the following result:

Final grade = Activity grade A * 0.15 + Activity grade B (≥4) * 0.50 + Activity grade C * 0.25 + Activity grade D * 0.10

Bibliography

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F. A. Champion, ENSAYOS DE CORROSIÓN, Urmo, Bilbao (1976)

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Samartin, A. RESISTENCIA DE MATERIALES. Colegio de Ingenieros de Caminos, Canales y Puertos.

Viedma, A. RESISTENCIA DE MATERIALES. ETSEIT.

Chuse, R. i Carson B.E. PRESSURE VESSELS, THE ASME CODE SIMPLIFIED. Editorial McGraw Hill.

Megyesy, E.F. MANUAL DE RECIPIENTES A PRESIÓN: DISEÑO Y CÁLCULO. Editorial Noriega.

Perry. MANUAL DEL INGENIERO QUÍMICO.

García Torrent, J. (editor). SEGURIDAD INDUSTRIAL EN ATMÓSFERAS EXPLOSIVAS. Laboratorio Oficial J.M.Madariaga. UPM.

Software

Language list

Name	Group	Language	Semester	Turn
(PAUL) Classroom practices	211	Catalan/Spanish	second semester	morning-mixed

(SEM) Seminars	211	Catalan/Spanish	second semester	morning-mixed
(SEM) Seminars	212	Catalan/Spanish	second semester	morning-mixed
(TE) Theory	21	Catalan/Spanish	second semester	morning-mixed