

Electronics and Electrotechnics

Code: 102436
ECTS Credits: 6

Degree	Type	Year	Semester
2500897 Chemical Engineering	OB	2	2

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

Contact

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Use of Languages

Principal working language: catalan (cat)
Some groups entirely in English: No
Some groups entirely in Catalan: Yes
Some groups entirely in Spanish: No

Prerequisites

Magnetic fields and waves

Objectives and Contextualisation

Acquiring the basic knowledge of the circuit theory applied to the study of electrical circuits and systems.

Become familiar with the different types of electric motors and their characteristics.

Introduce students to the basic of electronic systems.

Acquiring basic notions of the most important electronic devices.

Study the basic electronic systems that use the related devices.

Competences

- Analyse, evaluate, design and operate the systems or processes, equipment and installations used in chemical engineering in accordance with certain requirements, standards and specifications following the principles of sustainable development.
- Apply relevant knowledge of the basic sciences, such as mathematics, chemistry, physics and biology, and the principles of economics, biochemistry, statistics and material science, to comprehend, describe and resolve typical chemical engineering problems.
- Communication
- Demonstrate knowledge of the standards, legislation and regulations applicable to each situation.
- Develop personal attitude.
- Develop personal work habits.
- Develop thinking habits.
- Objectively compare and select different technical options for chemical processes.

Learning Outcomes

1. Adapt to unforeseen situations.
2. Analyse, evaluate and design electronic circuits and systems in the field of chemical engineering.
3. Analyse, evaluate and design single-phase and tri-phase electrical systems in accordance with certain requirements, standards and specifications, following the principles of sustainable development.
4. Apply relevant circuit theory knowledge to solve typical electronic problems in the field of chemical engineering.
5. Communicate efficiently, orally and in writing, knowledge, results and skills, both professionally and to non-expert audiences.
6. Develop critical thinking and reasoning
7. Develop curiosity and creativity.
8. Interpret the standards, legislation and regulations applicable to electronic and electrical systems.
9. Objectively distinguish different alternatives in electrical installations.
10. Work autonomously.

Content

1.- Direct current.

Laws of Kirchhoff. Transformations star-triangle and triangle-star. Theorem of the superposition. Problem resolution

2.- Alternating current.

RLC circuits. Problem resolution

3.- Single-phase circuits.

Single-phase motors. Active, reactive and apparent power. Power factor. Reactive correction. Problem resolution

4.- Three-phase circuits

Three-phase motors. Star and triangle connections. Active, reactive and apparent power. Power factor. Reactive correction. Problem resolution

5.- Low voltage electrical installations

Regulation. Electrics panels. Protections

6.- Introduction to electronic systems

Basic concepts. Semiconductors PN junctions

7.- Linear and non-linear electronic components

Resistances. Diodes. Transistors

8.- Electronic systems.

Power sources. Amplifiers

Methodology

Master classes and applied classes of problem solving

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

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Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Problem classes	15	0.6	1, 2, 3, 4, 5, 7, 6, 9, 8
Theoretical classes	30	1.2	2, 3, 7, 6, 9, 8
Type: Supervised			
Tutorials	15	0.6	5, 7, 6
Type: Autonomous			
Personal study	25	1	2, 3, 6, 8, 10
Problem solving	50	2	1, 2, 3, 4, 6, 10
Team working	9	0.36	1, 2, 3, 5, 7, 6, 9, 8, 10

Assessment

a) Process and scheduled evaluation activities

The course consists of the following evaluation activities:

- Activity A. Written test on the content of topics 1 and 2. The weight will be 30% of the final grade.
- Activity B. Written test on the content of topics 3, 4 and 5. The weight will be 30% of the final grade.
- Activity C. Written test on the content of topics 6, 7 and 8. The weight will be 25% of the final grade.
- Activity D. Work. Students must submit a written work that will have a weight of 15% 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 activities A, B and C.

The note will result from the following expression:

Final grade (continuous assessment) = Activity grade A (≥ 4) * 0.30 + Activity grade B (≥ 4) * 0.30 + Activity grade C (≥ 4) * 0.25 + Activity grade D * 0.15

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 A, B and / or C, 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 D (work) is not recoverable.

The recovery note will result from the following expression:

Final grade = Activity grade A (≥ 4) * 0.30 + Activity grade B (≥ 4) * 0.30 + Activity grade C (≥ 4) * 0.25 + Activity grade D * 0.15

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.

Regarding activity C (work), the student may keep the grade from the previous year's work or do a new job. The note of this activity will be kept for one year.

The grade of the subject will correspond to the following result:

Final grade = Activity grade A (≥ 4) * 0.30 + Activity grade B (≥ 4) * 0.30 + Activity grade C (≥ 4) * 0.25 + Activity grade D * 0.15

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Activity A	30%	1.75	0.07	1, 2, 5, 9
Activity B	30%	1.75	0.07	2, 3, 6, 9, 8
Activity C	25%	1.5	0.06	1, 2, 4, 5, 7
Activity D	15%	1	0.04	1, 2, 3, 4, 5, 7, 6, 9, 8, 10

Bibliography

P. Alcalde San Miguel. Electrotecnia. Paraninfo, 2008

P. Alcalde San Miguel. Electrónica. Paraninfo, 2009