

Degree programme	Type	Course
Chemical Engineering	OB	2
Chemical Engineering	OB	3

Contact lecturer

Name : Catalina Canovas Bermejo

Email : catalina.canovas@uab.cat

Teaching staff

Jordi Suñé Tarruella

Group languages

You can consult this information at the [end](#) of the document.

Prerequisites

Magnetic fields and waves

Objectives

Acquire the fundamental knowledge of circuit theory applied to the study of electrical circuits and systems.

Familiarize yourself with the different types of electric motors and their features.

To know the main properties of semiconductor electronic devices.

Analyze analog and digital circuits for different applications: rectifiers, trimmers, amplifiers, oscillators, logic gates.

Learning outcomes

1. Analyse, evaluate and design electronic circuits and systems in the field of chemical engineering.
2. 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.
3. Apply relevant circuit theory knowledge to solve typical electronic problems in the field of chemical engineering.
4. Apply relevant knowledge of the basic sciences to describe and resolve typical problems with material resistance.
5. Solve system design problems by applying knowledge of the basic sciences.

6. Objectively distinguish different alternatives in electrical installations.
7. Interpret the standards, legislation and regulations applicable to electronic and electrical systems.
8. Interpret the standards, legislation and regulations applicable to the design of systems.
9. Develop independent learning strategies.
10. Work cooperatively.
11. Apply knowledge of theory of circuits and electric machines in the design of equipment and facilities

Contents

1.- Direct current.

Electrical magnitudes. Active and passive circuit elements. Series and parallel combinations of passive elements. Superposition theorem. Equivalent circuits (Norton and Thévenin). Circuit analysis.

2.- The diode d'unió

Semiconductor. Junction diode. Circuits with diodes: trimmers and rectifiers. Power supplies.

3.- The MOS transistors. Digital applications: logic gates.

4.- Analog circuits with operational amplifiers.

5.- Data acquisition systems

Analog-to-digital and digital-analog converters. Acquisition cards.

6.- Corrent alterna

RLC circuits. Impedances. Vector diagrams. Circuit Resolution

7.- Single-phase circuits

Single-phase motors. Active, reactive and apparent power. Power factor. Reactive correction. Circuit Resolution

8.- Three-phase circuits

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

9.- Low voltage electrical installations

Regulation. Electrical panels. Protections

Learning activities and methodology

Title	Hours	ECTS	Learning outcomes
Tutorials	15	0.6	1, 2, 3, 4, 5, 6, 7, 8, 11
Personal study	30	1.2	1, 2, 6, 7, 8, 9, 10
Theoretical classes	30	1.2	1, 2, 3, 4, 5, 6, 7, 8, 11
Problem solving	54	2.16	1, 2, 3, 4, 5, 9, 10, 11
Problem classes	15	0.6	1, 2, 3, 4, 5, 11

Master classes and applied classes of problem solving
The virtual campus will be used for communication with students.

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

Continuous assessment activities

Title	Weight	Hours	ECTS	Learning outcomes
Activity D	15%	1	0.04	9, 10, 11
Activity A	35%	2	0.08	1, 3, 5, 7
Activity B	35%	2	0.08	2, 4, 5, 6, 7, 8, 11
Activity C	15%	1	0.04	3, 9, 10

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 5. The weight will be 35% of the final grade.
- Activity B. Written test on the content of topics 6 and 9. The weight will be 35% of the final grade.

- Activity C. Team assessment test. The weight will be 15% of the final grade. This activity is not recoverable.
- Activity D. Written test on the content of the topic 6. The weight will be 15% of the final grade. This activity is not recoverable.

To pass the subject, a minimum grade of 4 in activities A and B will be required.

The grade will result from the following expression:

Final grade (continuous assessment)= Activity grade A (≥ 4)*0.35 + Activity grade B (≥ 4)*0.35 + Activity grade C*0.15 + Activity grade D*0.15

b) Scheduling of evaluation activities

The schedule of the evaluation activities will be communicated at the beginning of the subject.

c) Recovery process

Students who have not passed the subject will be able to present themselves to the recovery of activity A and/or B, as long as 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 average mark of all the activities of the subject higher than 3.

The recovery note will result from the following expression:

Final grade = Activity grade A (≥ 4)*0.35 + Activity grade B (≥ 4)*0.35 + Activity grade C*0.15 + Activity grade D*0.15

Those students suspended for not having reached the minimum grade of 4 in activities A and/or B, 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 may only be awarded, at the discretion of the teaching team, to students with a final grade equal to or greater than 9.

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, use de la AI

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.

The use of AI in evaluation activities is not authorized

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. Only activities A and B are recovered, which represent 7 points of the subject's total.

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

Final grade = Activity grade A (≥ 4)*0.35 + Activity grade B (≥ 4)*0.35 + Activity grade C*0.15 + Activity grade D*0.15

h) Single Evaluation

This subject does not provide for the single evaluation system

Bibliography

A.P. Malvino, Principios de Electrónica, McGraw-Hill, 2007

A.B. Carlson, Teoría de circuitos, Thomson 2002

R.L. Boylestad, Introducción al análisis de circuitos, Pearson Education,

J. Millman. Microelectrónica. Circuitos i sistemes analògics i digitals. Hispano europea. 1991

L. Prat i altres, Circuitos y dispositivos electrónicos. Fundamentos de Electrónica. Edicions UPC. 1999

P. Alcalde San Miguel, Electrotecnia. Paraninfo, 2008

J. A. Navarro, Electrotecnia. Ediciones Ceysa, 2012

S. Catalán Izquierdo, Electrotecnia: instalaciones eléctricas. Editorial Universidad Politécnica de Valencia. 2014

Software

Course groups and languages

The information provided is provisional until November 30. After this date, you will be able to consult the language of each group through this [link](#). To access the information, you will need to enter the course CODE

Type of teaching	Group	Language	Semester	Shift
(TE) Theory	21	Catalan/Spanish	first semester	morning-mixed
(PAUL) Classroom	211	Catalan/Spanish	first semester	morning-mixed

practices				
(SEM) Seminars	211	Catalan/Spanish	first semester	morning-mixed