



Universitat de Lleida

# DEGREE CURRICULUM

# **ANALOGICAL ELECTRONICS**

Academic year 2015-16

## Subject's general information

<b>Subject name</b>	Analogical Electronics
<b>Code</b>	102123
<b>Semester</b>	1º Q
<b>Typology</b>	Obligatòria
<b>ECTS credits</b>	6
<b>Theoretical credits</b>	3
<b>Practical credits</b>	3
<b>Office and hour of attention</b>	Friday: 11:00 - 13:00 h / Despatx 2.18 entrada pel 2.19 Thursday 17:00- 19:00 h / Despatx 2.18 entrada pel 2.19
<b>Department</b>	Informàtica i Enginyeria Industrial
<b>Modality</b>	Presencial
<b>Important information on data processing</b>	Consult <a href="#">this link</a> for more information.
<b>Language</b>	Català 20.0 Castellà 80.0
<b>Degree</b>	Degree in Automation and Industrial Electronic Engineering
<b>Distribution of credits</b>	Juan Antonio Garriga Castillo 6
<b>Office and hour of attention</b>	Friday: 11:00 - 13:00 h / Despatx 2.18 entrada pel 2.19 Thursday 17:00- 19:00 h / Despatx 2.18 entrada pel 2.19
<b>E-mail addresses</b>	garriga@diei.udl.cat

Juan Antonio Garriga Castillo

## Subject's extra information

As previously described analogue electronics relies heavily on the knowledge and skills acquired in the subjects of Circuit Theory and Electronic Engineering Fundamentals making it very important that the students have taken the courses and studied the subjecta earlier. Without this knowledge base the course will provide a high level of difficulty to the student that takes it for the first time. It is also considered very convenient to have computer skills to manage electronic simulation programs around a personal computer.

Analogue Electronics is a 6-credit course, mandatory, which is taught in the first semester of the third year of the Degree in Industrial Engineering and Automation. This course complements the subject of Fundamentals of Electronic Engineering, we study the electronics part which is associated to the analog signal processing and therefore most of the circuits built around the operational amplifier and other integrated circuits. Thus requires knowledge and skills acquired in the course Fundamentals of Electronic Engineering and other acquired skills, specifically in the subject Circuit Theory.

## Learning objectives

The main objective of the course is to provide students with the skills to develop operational analog electronic systems. The main functional elements of analog electronics are described, as well as techniques that allow their utilizaci3nde reliably and econ3mica.La course assumes that students have acquired in previous courses, knowledge of discrete electronic devices as well as on their use and who they are familiar with the analysis of circuits in both time domain and frequency.

## Competences

### Degree-specific competences

- Applied knowledge of high-power electronics.
- Knowledge of the principles and applications of analogical electronics.

#### Goals

- The main objective of the course is to provide students with the skills to develop operational analog electronic systems. The main functional elements of analog electronics are described, as well as techniques that allow their utilizaci3nde reliably and econ3mica.La course assumes that students have acquired in previous courses, knowledge of discrete electronic devices as well as on their use and who they are familiar with the analysis of circuits in both time domain and frequency.
- Knowledge of the principles and applications of digital electronics and microprocessors.
- Applied knowledge of electronic instrumentation.

### Degree-transversal competences

- Ability to resolve problems and elaborate and defend arguments inside their field of study.
- Ability to analyse and synthesize.

## Subject contents

1. Differential and multistage amplifiers integrated.

2. Operational Amplifiers.
3. Frequency response.
4. Feedback and oscillators.
5. Active filters and tuned circuits.
6. Wave shaper circuits and data converters.

## Methodology

The theoretical contents of the subject treated is explained later problems will be solved and all the practical and theoretical issues worked on the topic will be analyzed.

Before entering the lab, the student must have previously analyzed and simulated circuit to ride and show a pre-report.

It will proceed to make practices on foreground.

Finally an examination will take place on the scheduled dates.

In this period the knowledge and skills acquired in the subject are measured.

## Development plan

During the first weeks of the course theory classes and problems develop first topic, and then (about the 3rd week) practice sessions were initiated in the laboratory for the issue developed.

This development plan will be conducted throughout the course, so, in the laboratory practices will be performed once acquired knowledge to carry them out.

The corresponding practical reports will be delivered as the same day deadline set for the completion of the partial examination, must contain the theoretical results, simulated and those obtained in the laboratory, practices made to date.

## Evaluation

To pass the course requires passing practices.

Theory (Examinations) 70%, the minimum score on each test to make half will be 4 out of 10. Minimum mark of theory to pass the course in May.

Practices (Assistance + Reporting) 20%, reports should contain the relevant practice analysis, simulation and the empirical data.

Non-contact work (collection of solved problems) 10%

### INSTRUCTIONS FOR THE CORRECT DEVELOPMENT REVIEW

Present the DNI / Passport in the test.

Always follow the instructions of the teacher in the allocation of seats to fill.

Leave necessarily always visible on the table ID / Passport, writing utensils and possible materials authorized for testing.

Leave folders, bags and / or backpacks where the professor noted.

Mobile phones or any telecommunications device must be disconnected and stored in bags or backpacks. The use of these devices and some other unauthorized material is strictly forbidden. If it detects that a student has activated, it will be expelled from the examination with the consequences arising.

You can not answer pencil, nor red or green ink.

While performing tests all students must have the pinna (ear) discovered for verification that they are not using hearing aids not allowed. During the exam students must always have both hands visible.

Correction and absolute silence during the examination.

The teacher may expel any student test violates these standards, with the consequences arising.

### GENERAL CRITERIA FOR THE CORRECTION OF TESTS

If you consider a section divided in approach ("We ..." "You ask ..."), development ("The application of Theorem with this hypothesis allows ...") and resolution ("In the expression of the theorem is replaced ... and simplifying get ... ") until the result, to gain score paragraph must be presented in an orderly and intelligible development.

One result is rejected if the source, that is to present a coherent development with the statement (no need to make an explicit approach, or copy or recreate the statement) is not indicated.

For maximum score is required, where applicable:

Getting the correct numerical result with SI units (International System).

Presenting graphic indicating the scales with correct units.

Present schemes, block diagrams, etc. unambiguously.

Pulchritude, conciseness, accuracy and clarity of presentation will be highly valued.

It is heavily penalized so could nullify the score in a section:

The dimensional and conceptual errors in reasoning.

The results without units or SI units are not.

The numerical errors that lead to reasonable results only slightly penalized.

Other numerical errors can become considered misconceptions.

In chained questions are not heavily penalized errors arising from the above results, provided that taking these as data does not represent a conceptual error and the results derived are reasonable.

## Bibliography

**Título:** ELECTRÓNICA

**Autor/es:** Hambley, Allan ;

**Editorial:** PRENTICE-HALL

**Título:** CIRCUITOS MICROELECTRONICOS. Análisis y diseño

**Autor/es:** Muhammad H. Rashid

**Editorial:** THOMSON

**Título:** AMPLIFICADORES OPERACIONALES Y CIRCUITOS INTEGRADOS LINEALES

**Autor/es:** Coughlin, Robert F. ; Driscoll, Frederick F.

**Editorial:** PRENTICE-HALL.

**Título:** CIRCUITOS ELECTRONICOS: DISCRETOS E INTEGRADOS

**Autor/es:** Donald L. Schilling - Charles Belove

**Editorial:** Mc Graw Hill

**Título:** ELECTRONICA: Teoria de Circuitos

**Autor/es:** Robert L. Boylestad - Louis Nashelsky

**Editorial:** Prentice Hall

**Título:** CIRCUITOS ELECTRONICOS: Análisis, Simulación y Diseño

**Autor/es:** Norbert R. Malik

**Editorial:** Prentice Hall

**Título:** MICROELECTRONICA: CIRCUITOS Y DISPOSITIVOS

**Autor/es:** Mark N. Horenstein

**Editorial:** Prentice Hall

**Título:** CIRCUITOS MICROELECTRÓNICOS

**Autor/es:** Sedra, Adel S. ; Smith, Kenneth C.

**Editorial:** McGraw Hill.