



Universitat de Lleida

DEGREE CURRICULUM  
**ELECTRONIC ENGINEERING  
BASICS**

Coordination: GARRIGA CASTILLO, JUAN ANTONIO

Academic year 2021-22

## Subject's general information

<b>Subject name</b>	ELECTRONIC ENGINEERING BASICS			
<b>Code</b>	102114			
<b>Semester</b>	2nd Q(SEMESTER) CONTINUED EVALUATION			
<b>Typology</b>	<b>Degree</b>	<b>Course</b>	<b>Character</b>	<b>Modality</b>
	Bachelor's Degree in Automation and Industrial Electronic Engineering	2	COMPULSORY	Attendance-based
	Bachelor's Degree in Energy and Sustainability Engineering	2	COMPULSORY	Attendance-based
	Bachelor's Degree in Mechanical Engineering	2	COMPULSORY	Attendance-based
	Double bachelor's degree: Degree in Mechanical Engineering and Degree in Energy and Sustainability Engineering	2	COMPULSORY	Attendance-based
	Master's Degree in Industrial Engineering	1	COMPLEMENTARY TRAINING	Attendance-based
Not informed	2	COMPULSORY	Attendance-based	
<b>Course number of credits (ECTS)</b>	6			
<b>Type of activity, credits, and groups</b>	<b>Activity type</b>	PRAULA		TEORIA
	<b>Number of credits</b>	3		3
	<b>Number of groups</b>	4		2
<b>Coordination</b>	GARRIGA CASTILLO, JUAN ANTONIO			
<b>Department</b>	COMPUTER SCIENCE AND INDUSTRIAL ENGINEERING			
<b>Teaching load distribution between lectures and independent student work</b>	60h of class 90h of autonomous work			
	1 ECTS = 10h of class + 15 h of autonomous work			

**Important information  
on data processing**

Consult [this link](#) for more information.

**Language**

Català 20%  
Castellà 80%

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
GARRIGA CASTILLO, JUAN ANTONIO	juanantonio.garriga@udl.cat	12	Monday from 5:00 p.m. to 7:00 p.m. / Office 2.18 entrance by 2.19.
URRECHO TORRES, JOSÉ MIGUEL	josemiguel.urrecho@udl.cat	6	Friday from 7:00 p.m. to 9:00 p.m. / Office 1.4

## Subject's extra information

Prior knowledge required to continue normally the course:

SUBJECT	KNOWLEDGE
Fundamentals of Circuit Analysis	Fundamentals of Electrical Engineering

The recommendations that follow are recommended to successfully achieve the goals outlined in the course are:

- Perform all activities, both individual and group proposals in the tutorial.
- Follow the lectures carefully picking explanations in writing most relevant concepts and analysis that the professor makes. Annotations written track taken during the lecture and consultation recommended readings will be the key to a correct learning of the subject.
- Write down on a sheet, in summary and each week, the concepts, methods major analysis or formulas have been studied.
- Consult the bibliography recommended to clarify or supplement the annotations about different concepts taught in lectures.
- Attend regularly, to tutorials to dispel any doubts about the most important theoretical concepts or solutions of exercises by the student.

### Subject / matter in the whole curriculum

This subject is closely linked to the subject of Electrical Engineering Fundamentals, knowledge being essential circuit analysis techniques taught in this course, to successfully achieve the learning objectives of the course Fundamentals of Electronic Engineering.

It should be noted that the learning acquired by students in this course are essential to successfully pursue other courses of semesters as: Digital Electronics, Power Electronics, Analog Electronics, etc.

## Learning objectives

### goals:

- Use the nomenclature and the technical jargon in describing the behavior electrical components and electronic systems.
- Recognize the properties and basic parameters of elementary signals used in electronic circuits and use their units.

- Recognize the function, basic characteristics and properties of components electronic components (resistors, capacitors and coils).
- Recognize the function, basic characteristics and models of components Active electronic (diode, bipolar and unipolar transistor) in an electronic circuit.
- Identify the block diagram of programmable electronics.
- Identify and distinguish the model and the basic properties of the amplifiers and use operational amplifiers ideal for implementation.
- List and define the main features of the functional blocks compose a basic electronic system (amplifier, comparator, attenuator, power supply, ADC, DAC, etc).

## Competences

### Cross - disciplinary competences

- **EPS1.** Capacity to solve problems and prepare and defence arguments inside the area of studies
- **EPS7.** Capacity to work in situations with a lack of information and/or under pressure.

### Specific competences

- - **GEEIA11.** Knowledge of the basics of electronics

## Subject contents

### Item 1: Introduction to Electronics

- 1.1. Basics of Electronics
- 1.2. Passive and active components
- 1.3. Basic analysis circuit
- 1.4. Basic analysis of circuits using PSPICE

### Item 2: Fundamentals of semiconductors

- 2.1. Theory and Technology of semiconductors
- 2.2. Currents in semiconductors

### Item 3: Semiconductor devices

- 3.1. The diode. Fundamentals and types
- 3.2. The unipolar and bipolar transistor
- 3.3. Other semiconductor devices

## Methodology

The activities are divided into three parts: lectures, problem solving and practical.

**Lectures:** Lectures present the contents of the subject orally by a teacher without the active participation of the students. At the end of the session, or when deemed appropriate, a question time will be opened.

**Problem solving:** In the problem solving activity, teachers present a complex issue that students must solve, either working individually or in teams.

**Practices:** They allow to apply and configure, at a practical level, the theory of a field of knowledge in a specific context. Before entering the laboratory, the student must have theoretically analyzed and simulated the circuits to be assembled and show a pre-report.

Problem classes and practices will be taught in small groups of students. The fact of having smaller groups of students favors dialogue and their participation.

The non-face-to-face activities are divided into two parts: to reinforce their knowledge autonomously based on the didactic material provided or recommended by the teacher, and the preparation of reports on the development of the practices.

It is **COMPULSORY** that the students bring the following elements of individual protection (EPI) to the practices at the laboratory.

- Blue laboratory gown from UdL (unisex)
- Protection glasses
- Mechanical protection gloves

They can be purchased through the shop Údels of the UdL:

C/ Jaume II, 67 baixos  
Centre the Cultures i Cooperació Transfronterera

<http://www.publicacions.udl.cat/>

The use of other elements of protection (for example caps, masks, gloves of chemical or electrical risk, etc.) will depend on the type of practice to be done. In that case, the teacher will inform of the necessity of specific EPI.

Not bringing the EPI's described or not fulfilling the norms of general security that are detailed below imply that the student can not access to the laboratories or have to go out of them. The no realisation of the practices for this reason imply the **consequences in the evaluation** of the subject that are described in this course guide.

## GENERAL NORMS OF SECURITY IN LABORATORY PRACTICES

- Keep the place of realisation of the practices clean and tidy. The table of work has to be free from backpacks, folders, coats...
- No short trousers or short skirts are allowed in the laboratory.
- Closed and covered footwear is compulsory in the laboratory.
- Long hair needs to be tied.
- Keep the laboratoy gown laced in order to be protected from spills of chemicals.
- Bangles, pendants or wide sleeves are not allowed as they can be trapped.
- Avoid the use of contact lenses, since the effect of the chemical products is much bigger if they enter between the contact lense and the cornea. Protection over-glasses can be purchased.
- No food or drink is allowed in the laboratory.
- It is forbidden to smoke in the laboratories.
- Wash your hands whenever you have contact with a chemical product and before going out of the laboratory.
- Follow the instructions of the teacher and of the laboratory technicians and ask for any doubt on security.

For further information, you can check the following document of the *Servei de Prevenció de Riscos Laborals*

## Development plan

Week	Methodology	Temary	Contact hours	Independent work hours
1-2	Master class problems	Tema1	8 h	12 h
3	Master class Simulation	Tema 1	4 h	6 h
4-5	Master class Practices	Tema 2	8 h	12 h
6	Master class problems	Tema 2	4 h	6 h
7-8	Master class Practices	Tema 2	8 h	12 h
9	Written test Delivery practices	Tema 1 a Tema 2 Practices	2 h	
10-11	Master class problems	Tema 3	8 h	12 h
12	Master class Simulation	Tema 3	4 h	6 h
13-14	Master class Practices	Tema 3	8 h	12 h
15	Master class problems	Tema 3	4 h	6 h
16	Written test Delivery practices	Tema 3 Practices	2 h	

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

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ELECTRÓNICA

Allan R. Hambley

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William H. Hayt, Jack E. Kemmerly, Jamie D. Phillips, Steven M. Durbin

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Juan Vicente Miguez, Francisco Mur, Manuel Alonso Castro, Jose Carpio

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Muhammad H. Rashid

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