Universitat de Lleida

DEGREE CURRICULUM

FUNDAMENTALS OF ELECTRONIC ENGINEERING

Academic year 2015-16

ELECTRONIC ENGINEERING BASICS 2015-16

Subject's general information

Subject name	Fundamentals of Electronic Engineering
Code	102114
Semester	2n Q Avaluació Continuada
Typology	Obligatòria
ECTS credits	6
Groups	Teoria: 2 Practicas: 4
Theoretical credits	3
Practical credits	3
Office and hour of attention	Tuesday 11:00 - 13:00 h / Office 2.18, 2.19 entry Tuesday 19:00 - 17:00 h / Office 2.18, 2.19 entry
Department	Informàtica i Enginyeria Industrial
Modality	Presencial
Important information on data processing	Consult this link for more information.
Language	Català 20% Castellà 80%
Degree	Degree in Automation and Industrial Electronic Engineering Degree in Mechanical Engineering
Distribution of credits	Juan Antonio Garriga Castillo 14.4 Jose Miguel Urrecho 2.4
Office and hour of attention	Tuesday 11:00 - 13:00 h / Office 2.18, 2.19 entry Tuesday 19:00 - 17:00 h / Office 2.18, 2.19 entry
E-mail addresses	garriga@diei.udl.cat jurrecho@diei.udl.cat

ELECTRONIC ENGINEERING BASICS 2015-16

Juan Antonio Garriga Castillo
Jose Miguel Urrecho

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.

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).

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Competences

Degree-specific competences

- Knowledge of the principles of electronics.

  Goals

  - Use the nomenclature and technical language in describing the electrical behavior of electronic components and systems.

- Recognize basic properties and parameters of elementary signals that are used in electronic circuits and manage their units.
- Recognize the role, characteristics and basic properties of passive electronic components (resistor, capacitor and coil).
- Recognize the role, basic characteristics and models of active electronic components (diode, transistor bipolar and unipolar) in an electronic circuit.
- Identify the block diagram of simple electronics.
- Identify and distinguish the model and the basic properties of the amplifiers and use op amps ideal for implementation.
- List and define the main characteristics of the functional blocks that comprise a basic electronics (amplifier, comparator, attenuator, power supply, ADC, DAC, etc).

Degree-transversal competences

- Ability to work under pressure and/or in situations where there is a lack of information.

  Goals

  - Interpret the basic information included in the data sheet of diodes, transistors (bipolar and unipolar) and operational amplifiers.
  - Identifying constraints of ideal models of the components.
  - Locate relevant features and applications of the components and subsystems in the technical literature.

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

  Goals

  - Use the basic techniques of circuit analysis to analyze the performance of basic circuits with diodes.
  - Understanding graphically and analytically the operation of bipolar and unipolar transistors.
  - Understanding the behavioral-level model, the diodes, bipolar and unipolar transistors working under small signal.
  - Use the basic techniques of circuit analysis to analyze the performance of basic circuits with bipolar and unipolar transistors.
  - Use the basic techniques of circuit analysis to analyze the performance of linear and nonlinear circuits based on operational amplifiers.
  - Use circuit simulation software to help analyze analog and circuit design based on diodes, transistors (bipolar and unipolar) and operational amplifiers.
  - Designing, from a specification, circuits based on low complexity diodes, transistors (bipolar and unipolar) and operational amplifiers.
  - Implement low complexity circuits based on diodes, transistors (bipolar and unipolar) and operational amplifiers.

Subject contents

Item 1: Introduction to Electronics

Basics of Electronics

Passive and active components

Basic analysis circuit

Basic analysis of circuits using PSPICE

Item 2: Fundamentals of semiconductors

Theory and Technology of semiconductors

Item 3: Semiconductor devices

The diode. Fundamentals and types

The unipolar and bipolar transistor

Other semiconductor devices

Item 4: Subsystems analog integrated circuits

operational Amplifier

Comparators

A / D and D / A

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 the theory and practice.
Theory (Examinations) 70%, the minimum score on each test to make half will be 4 out of 10. Minimum mark to pass the theory 5

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

Without translate-

ANALISIS BASICO DE CIRCUITOS EN INGENIERIA

J. David Irwin

Editorial Prentice Hall

ELECTRÓNICA

Allan R. Hambley

Editorial Prentice Hall

CIRCUITOS MICROELECTRONICOS. Análisis y diseño

Muhammad H. Rashid

Editorial: THOMSON

CIRCUITOS ELECTRONICOS: DISCRETOS E INTEGRADOS

Donald L. Schilling - Charles Belove

Editorial Mc Graw Hill

ELECTRONICA: Teoria de Circuitos

Robert L. Boylestad - Louis Nashelsky

Editorial Prentice Hall

CIRCUITOS ELECTRONICOS: Análisis, Simulación y Diseño

Norbert R. Malik

Editorial Prentice Hall

MICROELECTRONICA: CIRCUITOS Y DISPOSITIVOS

Mark N. Horenstein

Editorial Prentice Hall