



20005 - DIGITAL ELECTRONICS (2018-19)

General

Code: 20005

Lecturer responsible:

SELVA VERA, JESUS

Credits ECTS:	6
Theoretical credits:	1,2
Practical credits:	1,2
Distance-base hours:	3,6

Departments involved

- **Dept:** PHYSICS, ENGINEERING SYSTEMS AND SIGNAL THEORY
Area: SIGNAL THEORY AND COMMUNICATIONS
Theoretical credits: 1,2
Practical credits: 1,2
This Dept. is responsible for the course.
This Dept. is responsible for the final mark record.

Study programmes where this course is taught

- DEGREE IN SOUND AND IMAGE IN TELECOMMUNICATION ENGINEERING
Course type: COMPULSORY (Year: 1)

Competencies and objectives

Course context for academic year 2018-19

DIGITAL ELECTRONICS 20005. (First year, second semester)

a) 6 ECTS credits. Theory 30h, 15h problems, 15h laboratory practice (10 sessions, beginning the fourth week of class)

b) Recommendations of previous courses:

- BASIC ELECTRONICS (First year, first semester)
- PHYSICAL BASIS OF ENGINEERING (First year, first semester)
- BASIC MATH (First year, first semester)

Course content (verified by ANECA in official undergraduate and Master's degrees)

UA Basic Transversal Competences

- **CT11** : Capacity to learn and apply new concepts and methods in an autonomous and interdisciplinary fashion.
- **CT12** : Capacity to assimilate and adapt to the permanent evolution of technology when developing one's professional career.
- **CT13** : Capacity to adopt the scientific method when planning and carrying out different academic and professional tasks.
- **CT7** : Capacity for oral and written exposition.
- **CT8** : Capacity to plan tasks and commit oneself to satisfying goals and deadlines.
- **CT9** : Capacity for group work.

Specific Competences:>>Basic

- **B4** : Understand and master the basic concepts of linear systems and the related functions and transforms, electric circuit theory, electronic circuits, physical principle of semiconductors and logical families, electronic and photonic devices, materials technology and their application to solve engineering problems.

Basic Transversal Competences

- **CT1** : Students should show they possess and understand knowledge in a field of study that continues from general secondary education and is usually found at a level which, although supported by advanced textbooks, also includes certain aspects that involve knowledge arising from the cutting edge of their field of study.
- **CT2** : Students should know how to apply their knowledge to their job or vocation in a professional manner and should possess those skills that are usually reflected when preparing and defending arguments and solving problems in their field of study.
- **CT3** : Students should have the ability to gather and interpret relevant data (normally within their field of study) to give opinions that include a reflection on important, social, scientific, ethical matters, etc.
- **CT4** : Students should be able to transmit information, ideas, problems and solutions to both specialist and non-specialist audiences.

Specific Competences: >> Competences Common to the Telecommunications Branch

- **C9** : Capacity to analyse and design combinational and sequential circuits, synchronous and asynchronous, and use microprocessors and integrated circuits.

Exclusive skill taught in this course

No data

Learning outcomes (Training objectives)

No data

Specific objectives stated by the academic staff for academic year 2018-19

* Analysis and design of basic digital electronic circuits.

* Familiarity with basic electronic components and ability to interpret correctly the data sheets of components.

* Familiarity with laboratory instrumentation handling applied to the analysis and design of basic digital electronic circuits.

Content and bibliography

Content for academic year 2018-19

Theme 1: Introduction to Digital Electronics.

Analog and digital magnitudes. Modelling of digital signals. Operations and basic logical functions. Introduction to information coding techniques.

Theme 2: Boolean algebra and logic function simplification.

Boolean algebra. Basic concepts. Properties of Boolean algebra. Representation of logic functions. Karnaugh maps and minimization of Boolean expressions. Logic gates.

Theme 3: Combinational circuits.

Introduction. Adders. Comparators. Coders / decoders. Multiplexers / demultiplexers. Generators / parity checkers.

Theme 4: Sequential circuits.

Introduction. Latch SR. Latch D. Flip-flop circuit synchronization. Flip-flop operation parameters. Counters. Asynchronous binary counters. Synchronous counters. Shift registers. Basic functions. Counters based on shift registers.

Theme 5: Analog-to-digital interfaces.

A/D conversion. Sample-and-hold circuits. A/D conversion techniques.

Assessment

Assessment procedures and criteria 2018-19

*** Evaluation formulas**

In the July and December exam calls, both the mark following the continuous evaluation and the final exam's mark will be considered. The subject's mark will be the maximum of both. The marks in the first and second calls will be computed following the next formula, **provided the practice and final exam marks are not below four**:

- First exam call:

$$\text{Subject's first call mark} = \text{Prac} * 0,25 + \text{Contr} * 0,25 + \text{ExFinal1} * 0,5,$$

where "Prac" is the practices mark, "Contr" is the short exams' mark, and "ExFinal1" is the first call final

exam mark (June). Both "Prac" and "ExFinal1" must be greater or equal than 4 for passing the subject.

-Second exam call:

$$\text{Subject's second call mark} = \max(\text{NotaA}, \text{ExFinal2})$$

where "max" is the maximum function and "NotaA" is computed as follows

$$\text{NotaA} = \text{Prac} * 0,25 + \text{Contr} * 0,25 + \text{ExFinal2} * 0,5,$$

where "ExFinal2" is the second call final exam mark (July or December).

As can be readily inferred, the practices and short exams' mark are taken into account in the second call. However, it is possible to recover the whole subject in the second call if the corresponding final exam is passed (ExFinal2).

*** Minimal mark of four in practices and final exam**

In order to pass the subject, it is necessary to obtain at least a mark four (4) in both the practices and the final exam.

*** Non-recoverable practices**

The lab practices are not recoverable. The non-assistance to any lab session will produce a corresponding reduction in the practices mark.

*** Exceptional cases**

In exceptional cases, as for students registered after the course start, the marks of those activities performed before the registration date will not be taken into account in the subject's final mark.

*** Note on plagiarism**

All works performed for the subject must be original. Any plagiarism, either partial or total, will produce a "0" mark in the corresponding work. Additionally, the Head of the Department and the Polytechnical School (EPS) will be informed about the situation. In case of a repeated plagiarism, the vice-rectory will also be informed so that the case is investigated and the corresponding penalties applied, following the existing legislation (Reglamento de disciplina académica de los Centros oficiales de Enseñanza Superior y de Enseñanza Técnica dependientes del Ministerio de Educación Nacional BOE 12/10/1954).

Description	Criteria	Type	Weighting system
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Control of continual work and personal study II	<p>Periodic tests corresponding to the subject explained. Maximum of 3, an hour long. Weeks 5, 8 and 13.</p> <p>Note: The assessment of any activity, question, or problem will be done taking into account the following:</p> <ul style="list-style-type: none"> -Solutions must be thoroughly justified. -The proposed problem and the solution given must match each other. -Presentation clarity, either written or spoken. -Spelling mistakes. 	ACTIVITIES OF EVALUATION DURING THE SEMESTER	25
Evaluation of lab work	<p>There will be four lab practices from one to three sessions lasting. A total of 10 sessions, beginning the fourth week of the course. Students will be organized in pairs. In each of the practices through a script a priori defined and published it offers students a series of questions and tasks they should perform in the laboratory. During implementation, students must complete a document with the results of calculations and measurements. After each practice, the teacher delivered an outcome document that will be scored between 0 and 10. Weeks 7, 9, 12 and 13. It is necessary to obtain at least a grade 4 in this part to pass the subject.</p> <p>Note: The assessment of any activity, question, or problem will be done taking into account the following:</p> <ul style="list-style-type: none"> -Solutions must be thoroughly justified. -The proposed problem and the solution given must match each other. -Presentation clarity, either written or spoken. -Spelling mistakes. 	ACTIVITIES OF EVALUATION DURING THE SEMESTER	25

Final exam	<p>Written final exam comprising the whole subject, including questions addressed in class, problem classes, or lab.</p> <p>It is necessary to obtain at least a grade 4 in this part to pass the subject.</p> <p>Note: The assessment of any activity, question, or problem will be done taking into account the following:</p> <ul style="list-style-type: none"> -Solutions must be thoroughly justified. -The proposed problem and the solution given must match each other. -Presentation clarity, either written or spoken. -Spelling mistakes. 	FINAL TEST	50
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Official exam dates for academic year 2018-19

Exam session	Date	Time	Group - Classroom(s) allocated	Comments
(C3) Periodo ordinario para asignaturas de segundo semestre y anuales	05/06/2019			Teoría
(C4) Pruebas extraordinarias para asignaturas de grado y máster	08/07/2019			Teoría

