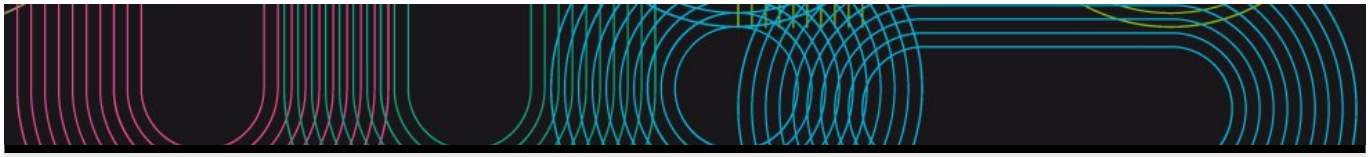
Universidade Vigo

Subject Guide 2018 / 2019



IDENTIFYING DATA				
Electronic Technology				
Subject	Electronic Technology			
Code	V05G300V01401			
Study programme	Degree in Telecommunications Technologies Engineering			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	2nd	2nd
Teaching language	Spanish			
Department	Electronics Technology			
Coordinator	Raña García, Herminio José			
Lecturers	Cao Paz, Ana María Marcos Acevedo, Jorge Quintáns Graña, Camilo Raña García, Herminio José Valdés Peña, María Dolores			
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General description	This course is dedicated to the utilisation of integrated circuits, in particular operational amplifiers, as well as to the following fields: Electronics of Power, Electrotechnics in the aspects of electrical installations and to the conversion of photovoltaic solar energy and thermal.			

Competencies	
Code	
B13	CG13 The ability to use software tools that support problem solving in engineering.
B14	CG14 The ability to use software tools to search for information or bibliographical resources.
C14	CE14/T9: The ability to analyze and design combinatory and sequential, synchronous and asynchronous circuits and the usage of integrated circuits and microprocessors.
C16	CE16/T11: The ability to use different energy sources, especially photovoltaic and thermal ones, as well as the fundamentals of power electronics and electronics

Learning outcomes		
Expected results from this subject	Training and Learning Results	
To know how to analyse and use circuits with operational amplifiers and with other integrated circuits.	B13 B14	C14
To know the foundations of Electrotechnics.		C16
To know the foundations of the Power Electronics and the basic topologies of the power electronic converters.	B13 B14	C16
Ability to use distinct sources of energy and especially photovoltaic solar energy and thermal solar energy.	B13	C16

Contents	
Topic	
Operational amplifiers and other integrated circuits	Introduction to amplifiers: Aspects of frequency response in amplifiers. Bode diagrams. Principles of operation of an operational amplifier. Application circuits for operational amplifiers. Other integrated circuits of general application.
Power Electronics (I)	Introduction to Power Electronics. Power electronic devices .
Power Electronics (II)	DC power supplies. DC-DC converters.
Power Electronics (III)	Single-phase rectifiers. Single-phase inverters.

Electrotechnics	Electrical installations. Protections.
Photovoltaic and thermal solar energy	Photovoltaic and thermal solar installations. Photovoltaic cells. Photovoltaic panels. Photovoltaic systems of energy conversion.

Planning			
	Class hours	Hours outside the classroom	Total hours
Lecturing	18	18	36
Laboratory practices	22	22	44
Problem solving	6	12	18
Essay questions exam	3	15	18
Problem solving	3	15	18
Laboratory practice	4	12	16
*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.			

Methodologies	
	Description
Lecturing	The teacher exposes the theoretical contents. This activity is individual. In these activities skills CE14 and CE16 are developped.
Laboratory practices	They include circuit mounting and testing and computer electronic circuits simulation. Some practical classes will also include some web search made by the student, about some technical information about some specific electronic devices used in the practical classes (e.g. some kind of transistors or operational amplifiers). This activity is collective. The students work in teams of two persons in each laboratory position. Through this methodology the competencies CE14, CE16, CG13 and CG14 are developed.
Problem solving	The teacher will solve exercises about most of the chapters. This activity is individual. Through this methodology the competencies CE14 and CE16 are developed.

Personalized attention	
Methodologies	**Description**
Lecturing	The students may attend to the professor office in the office hours published in the course webpage. Doubts about the contents of the master classes will be resolved in this tutorship time as well as doubts about how to prepare their study.
Laboratory practices	The students may attend to the professor office in the office hours published in the course webpage. Doubts arisen to the students about the practices of laboratory, about how to use the instrumentation or about the implementation of the electronic circuits and the simulation software will be resolved in this sessions.
Problem solving	The students may attend to the professor office in the office hours published in the course webpage. Doubts arisen to the students on the problems and/or exercises proposed and resolved in the classroom will be resolved in this tutorship time as well as other problems and/or exercises that can appear along the study of the subject.

Assessment			
	Description	Qualification	Training and Learning Results
Essay questions exam	They make part of each partial examination of theory, in which they are half of its value.The number of tests and how they work are detailed in "Other comments and July evaluation".	35	C14 C16
Problem solving	They make part of each partial examination of theory, in which they are half of its value.The number of tests and how they work are detailed in "Other comments and July evaluation".	35	C14 C16

Laboratory practice	They are made in the laboratory. They consist of the kind of tasks made or prepared during the practices of the course: the practical exams consist of: 1) mounting of circuits, making measures on them and answering questions related with these circuits and 2) simulation of circuits equal or similar to the ones studied in the practices and answering questions related with this simulation. In the laboratory practice exams the student will be allowed to use some especific technical information collected by the student during the practices (e.g. datasheets from manufacturers).	30	B13 C14 B14 C16

Other comments on the Evaluation

A process of continuous assessment based on midterms is established, but the student may choose alternatively a single assessment in a final exam.

Partial exams are not recoverable, i.e., if a student can not attend the day they are scheduled, teachers do not have obligation to repeat them. The grades for the partial exams are valid only for the academic year in which they are made.

Note 1: During exams mobile phones must be turned off and kept away. It is not allowed to use them as calculators. The student must have a calculator.

Note 2: It is not allowed to enter the classroom after an exam begins.

Continuous assessment:

For continuous assessment, the contents of theory are divided into three blocks and the contents of laboratory are divided into two blocks.

The student joins continuous evaluation if and only if he/she attends to any of the partial exams (either theoretical or laboratory ones) . From that moment, the student is considered as presented, and if he/she doesn't attend to any other partial exams, his/her mark on them will be zero.

As specified below, 4 points (out of 10) is considered as minimum grade in each block, as well as minimum theory grade, laboratory grade or grade of each block (grade of a partial examination or grade of that block in the final examination, in theory or practice, as well).

Regarding theory:

There are two partial exams, for the first two blocks. The student must repeat each partial exam in the final exam if the grade on any of them is less than 4. The exam of the third block is done by all students in the final exam.

If a student gets a grade of at least 4 points in a partial exam, he/she can try to improve the mark of that block in the final exam, but the grade in that block will be the one obtained in the final exam, even though it is less than the grade obtained in the partial exam.

The theory grade NT is the average grade of the three blocks, if the three student's grades exceed 4 point. If in any of the three blocks, the student does not reach 4 points, his/her theory grade is the minimum between 3.5 and the average of the three blocks.

The partial exams take place on the usual weekly scheduling of the classes and last 1 hour and 50 minutes each.

They include both one half (in time and in mark) of development questions and one half exercises.

The duration of each block of the final theory exam (first, second and third) is one hour.

Regarding practices:

Laboratory practices are assessed through practical exams described above (laboratory exams).

The practices of the two blocks are examined in two partial laboratory exams. The student must repeat a lab exam in the final exam if his/her mark in it is less than 4.

To participate in the partial exams of laboratory practices the student must attend to all the laboratory practices. Nevertheless, the students that do not fulfil this requirement can attend to the partial exams of theory and liberate themselves from its contents for the final theory exam.
If a student gets a grade of at least 4 points in a partial laboratory exam, he/she may try to improve the grade of that block in the final exam, but the grade in that block will be the one obtained in the final exam, even though it is less than the grade obtained in the partial exam.

The practice note NP is the average grade of the two blocks, if the grade of the student in both partial exams exceeds 4 points. If the student doesn't reach 4 points in any of the two blocks, his/her practice grade is the minimum between 3.5 and the average of the two blocks.

Material for practical exams:

The student must take to the practical exams the datasheets of the semiconductors used during the practices, which the student must gather as the practices are carried out. The student can also take to the practical exams the practices printed, bound or stapled, along with annotations added by the student during the realization of the practices, according to rules that will be detailed on the web of the subject.

VERY IMPORTANT: The students who want to attend to the lab final exam of the course must enroll for it, prior to the exam, via the subject web (section"Inscripciones"). The teachers of the subject will communicate through an announcement on that website a deadline for such preinscription. This preinscription is necessary to schedule the shifts for the lab exam. Only the students enrolled before that date will have right to do the lab exam.

Final grade:

The final grade NF is NT x 0.7 + NP x 0.3, if NT and NP are both at least 4 points. Otherwise NF is the minimum between 4.5 and NT x 0.7 + NP x 0.3 . NT and NP are calculated as indicated above. The student passes the subject in May session (first call) if the final grade NF is greater than or equal to 5.

Assessment by single exam

The students who choose single test assessment do the same final exam as those other who are assessed by continuous assessment and who have reached the minimum grade in no partial exam, i.e., they have to make all the final examination, both the three blocks of theory and the two blocks of lab practices.

The theory grade NT, the practice grade NP and the final grade NF are calculated in the same way as indicated above, for students assessed by continuous assessment.

Second chance

The second chance exam consists of two parts:

- A theory exam, 3 hours long. Its grade is NT.

- A laboratory exam, 1 hour 50 minutes long. Its mark is NP.

Unlike the final exam (first call), this exams are not divided into blocks.

The grade in this second chance exam, NR, is NT x 0,7 + NP x 0,3, where NT is the theory exam grade and NP is the laboratory exam grade, provided that NT and NP are both greater or equal to 4 points. Otherwise, the grade in this second chance is the minimum between 4.5 and NT x 0,7 + NP x 0,3.

In the second chance, all the students can attend to both sections (theory and practice). The rule of □highest grade□ which is compulsory for the total grade of all the subjects, will apply in this subject also extended to each section; i.e., the theory grade of each student to calculate the grade for the second chance will be the highest between the May theory mark (first call) and the mark in the second chance theory exam. The same for the laboratory grade.

VERY IMPORTANT: In the same way as stated for the May final proof, the students who want to attend to the second chance laboratory exam must enroll to attend to it, via the subject web. The teachers of the subject will communicate through an announcement on that website a deadline for such preinscription. This preinscription is necessary to schedule the shifts for the laboratory exam. Only the students who enroll before that date will have right to do the laboratory exam.

END OF CAREER EXAM

The end of career (E.C.) exam has the same structure as the second chance exam and its grade is calculated the same way as in the second chance exam, except that no grade of a previous opportunity is retained (neither from partial exams nor from final nor second chance exam): the grade of a student in the E.C. act depends for all students only upon the E.C. exam itself.

Sources of information
Basic Bibliography
Hambley, A. R., **Electrónica**, Prentice-Hall, 2ª ed. en español,
Hart, D. W., **Electrónica de potencia**, Prentice-Hall,

Quintáns Graña, C., **Simulación de circuitos con OrCAD 16 DEMO**, Marcombo,

Complementary Bibliography

Rashid, Muhammad H., **Electrónica de potencia: circuitos, dispositivos y aplicaciones**, Pearson Education,

Reglamento Electrotécnico para Baja Tensión (REBT) e Instrucciones Técnicas Complementarias (ITC),

Schneider Electric España, S.A., **Guía de diseño de instalaciones eléctricas (PDF de uso libre disponible en www.schneiderelectric.es)**, Schneider Electric España, S.A,

Guirado, R., **Tecnología eléctrica**, McGraw-Hill,

AENOR, **Norma UNE 60617 de Símbolos gráficos para esquemas eléctricos**,

Carta, J. A. y otros, **"Centrales de energías renovables: Generación eléctrica con energías renovables"**, Pearson-UNED,

Recommendations

Subjects that continue the syllabus

Analogue Electronics/V05G300V01624
Power Electronics/V05G300V01625

Subjects that it is recommended to have taken before

Physics: Analysis of Linear Circuits/V05G300V01201
Physics: Fundamentals of Electronics/V05G300V01305

Other comments

The student should have good knowledge about the course "Física: Fundamentos de Electrónica"/V05G300V01305 ("Physics: Electronics Fundamentals"/V05G300V01305), in both its theoretical contents as well as in the laboratory practic classes.