



IDENTIFYING DATA

Power electronics

Subject	Power electronics			
Code	V12G330V01701			
Study programme	Grado en Ingeniería en Electrónica Industrial y Automática			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	4th	1st
Teaching language	Spanish Galician			
Department				
Coordinator	Doval Gandoy, Jesús López Sánchez, Óscar			
Lecturers	Doval Gandoy, Jesús López Sánchez, Óscar Nogueiras Meléndez, Andres Augusto			
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General description	The aim that pursues with this *asignatura is that the *alumnado purchase the foundations of the electronics of power and the knowledges for the design of the electronic converters connected to the electrical network and his applications, so much from the theoretical point of view like practical.			

Skills

Code	
B3	CG3 Knowledge in basic and technological subjects that will enable students to learn new methods and theories, and provide them the versatility to adapt to new situations.
B4	CG4 Ability to solve problems with initiative, decision making, creativity, critical thinking and the ability to communicate and transmit knowledge and skills in the scope of industrial engineering in the field of Industrial Electronic and Automation.
C22	CE22 Applied knowledge of power electronics.
C24	CE24 Ability to design analog, digital and power electronic systems.
D2	CT2 Problems resolution.
D6	CT6 Application of computer science in the field of study.
D9	CT9 Apply knowledge.
D17	CT17 Working as a team.

Learning outcomes

Expected results from this subject	Training and Learning Results		
Understand the operation of the devices of power, his shot and his turned off.	B3	C22 C24	D2 D9
Comprise the basic appearances for the protection of the devices of power.		C22	D2 D9
Understand the basic operation of the conversion of electrical energy with electronic converters of power	B4	C22	D2 D6 D9
Purchase skills on the process of simulation of electronic converters of power.			D6 D9 D17

Contents

Topic	
INTRODUCTION	- Generalities. - Semiconductors of power and characteristic of control.
ELECTRONIC COMPONENTS OF POWER	- Diodes of power. - Bipolar transistors, *MOSFET and *IGBT of power. - Thyristors. Shot and blockade
CONVERTERS *CA/CC	- Rectification no controlled. - Association of teams *rectificadores. - Rectification controlled.
CONVERTERS CC/*CA	- Static investors: Introduction. - Control of the tension. - Converters CC/*CA commutated *PWM with transistors. - Investors with thyristors.
CONVERTERS CC/CC	- Converters CC/CC with thyristors

Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	21	0	21
Problem solving	9.5	9.5	19
Laboratory practical	18	0	18
Autonomous problem solving	0	35	35
Previous studies	0	55	55
Essay questions exam	2	0	2

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies

	Description
Lecturing	They will develop in the schedules fixed by the direction of the centre. They will consist in an exhibition by part of the professor of notable appearances of the matter that will be related with the matters that previously had to work the student. In this way favourable the active participation of the same, that will have occasion to expose doubts and questions during the session.
Problem solving	They will develop in the schedules fixed by the direction of the centre. When it result timely or notable will proceed to the resolution of examples and/or problems that illustrate properly the problematic to treat.
Laboratory practical	During the sessions of practices the students will realise activities of the following type: - Setting of circuits. - I handle of electronic instrumentation - Measured on circuits - relative Calculations to the setting and/or measures of *comprobación - Compilation and representation of data At the end of each session of practical each group will deliver the leaves of corresponding results.
Autonomous problem solving	After each theoretical session of classroom the student would have to realise, of systematic form a study of consolidation and review where would have to remain resolved all his doubts with respect to the matter. The doubts or unsolved appearances will have to expose them to the professor to the greater shortness, so that this use these doubts or questions like element of *realimentación of the process of education-learning.
Previous studies	It is absolutely indispensable that, for one correct *aprovechamiento, the student realise a previous preparation of the practical sessions of laboratory, for this will supply him indications and specific material for each session with *antelación sufficient. The student will have to work previously on the material supplied and also has to have prepared the necessary theoretical appearances to tackle the session. This previous preparation will be an element that will have very in account to the hour to evaluate each practical session.

Personalized assistance

Methodologies	Description
Laboratory practical	

Assessment

Description	Qualification	Training and Learning Results

Laboratory practical	The practices of laboratory will evaluate of continuous way (session to session). The criteria of evaluation are: - A minimum assistance of 80%. - *Puntualidad. - Previous preparation of the practices. - *Aprovechamiento Of the session. - The practical sessions will realise in groups of two students. The billed of the practices will be the disposal of the students with *antelación. - The students answered in a group of leaves the results, that will deliver to the ending of the practice. These leaves will serve to justify the assistance and value the *aprovechamiento.	20	C22	D6 D17
Essay questions exam	It will consist in a proof written of individual and face-to-face character that will realise when finalising the *cuatrimestre, in the schedules established by the direction of the centre. The proof will be able to consist in a combination of the following types of exercises: - you Question type test. - Questions of short answer. - Problems of analysis. - Resolution of practical cases.	80	B4 C22 C24	D2 D6 D9

Other comments on the Evaluation

To surpass the *asignatura, the student has to obtain 5 points on 10.

Recommendations:

The students will be able to consult any relative doubt to the activities assigned to the group of work to the that belong or the matter seen in the face-to-face hours in the hours of *tutorías or through the means related in the section of Attention to the student.

The students have to fulfil *inexcusablemente the terms established for the different activities.

In the different proofs advises to the students that justify all the results that reach. To the hour to mark them will not give any result by *sobrentendido and will take into account the method employed to arrive to the solution proposed.

It recommends , in the presentation of the diverse exercises, not presenting faults of spelling and characters or unreadable symbols, because they will affect the final punctuation.

During the realisation of the final examination the mobile telephones will have to be turned off, and, only in the case that authorise previously, will be able to use aim, computers or another material of support.

Guidelines for the improvement and the recovery:

In case that a student do not approve the matter in the first announcement, has of a second announcement in the present academic course. The corresponding final qualification for this second announcement will obtain like result to add the following notes:

- 1.- The note obtained in the evaluation of the practices of laboratory in the first announcement, with a weight of 20% of the final qualification.
- 2.- The note obtained in the evaluation the evaluation of the thematic blocks with the same *contextualización that in the first announcement. The weight of this note is of 20% of the final qualification.
- 3.- The note obtained in the evaluation of the final examination realised in this announcement with the same *contextualización that in the first announcement. The weight of this note is of 60% of the final qualification.

To approve the matter in this second announcement is necessary to obtain an equal final punctuation or upper to 5 points.

Once finished the present academic course the note obtained in the evaluation of the final examination loses his validity. The notes obtained in the evaluations of practices and of the thematic blocks will keep during the two academic courses following to the present course, except that the student wish to do them again.

Evaluation of students with renunciation to the evaluation continued:

The students that was them conceded, of official form by the centre, the renunciation to the evaluation continued, will have to realise a proof written similar to the proof *individualizada of long answer and a practical proof of laboratory.

Both proofs will have a maximum punctuation of 10 points. The final note will be the average of the notes of the two proofs. To surpass the *asignatura will have to obtain an equal or upper note to 5 points. The proof written will realise when finalising the *cuatrimestre, in the schedules established by the direction of the centre. The practical proof in a near date to the previous and that will propose in function of the availability of the laboratories.

Commitment: *Espérase that or present

student a *comportamento ethical *axeitado. No case to detect a *comportamento

*non ethical (copy, *plaxio, utilisation of electronic devices *non authorised,

and *outros) *considerarase that or student *non gather you necessary requirements to

surpass to matter. *Neste Case to global qualification no present academic course will be of suspense (0.0).

Sources of information

Basic Bibliography

Ned Mohan, Tore M. Undeland y William P. Robbins, **Electrónica de potencia: convertidores, aplicaciones y diseño.**, 978-9701072486, 3ª, McGraw-Hill, 2009

Andrés Barrado Bautista y Antonio Lázaro Blanco, **Problemas de electrónica de potencia**, 9788420546520, 1ª, Pearson, 2007

N. Mohan, T.M. Undeland, W.P. Robbins., **POWER ELECTRONICS: CONVERTERS, APPLICATIONS AND DESIGN.**, 2ª, McGraw-Hill, 2003

M.H. Rashid, **ELECTRÓNICA DE POTENCIA: CIRCUITOS, DISPOSITIVOS Y APLICACIONES**, 2004,

S. Martínez García y J.A.Gualda Gil., **ELECTRÓNICA DE POTENCIA: Componentes, topologías y equipos**, 2006, D.W.Hart, **ELECTRÓNICA DE POTENCIA**, 2001.,

Complementary Bibliography

Recommendations

Subjects that continue the syllabus

Industrial electronics/V12G330V01924

Final Year Dissertation/V12G330V01991

Subjects that are recommended to be taken simultaneously

Electronic instrumentation 2/V12G330V01921

Real-time control systems/V12G330V01913

Subjects that it is recommended to have taken before

Fundamentals of electronics/V12G330V01402

Digital electronics and microcontrollers/V12G330V01601

Three-phase systems and electrical machines/V12G330V01505

Digital electronic systems/V12G330V01923

Other comments

To enrol in this *asignatura is necessary to have surpassed or be enrolled in all the matters of the inferior courses to the course in that it is situated this *asignatura.

Contingency plan

Description

The contents and the results of learning will not owe to be modified for power guarantee the collected in the memories of the qualifications. It owes to treated to adjust the materials, tutorships and the teaching methodologies to treat to achieve these results. It treats of an aspect of big importance stop the overrun of the processes of the one who are subjected the different qualifications. And say, the plan of contingency owes to based in a development of the subject, adapting the methodologies and the materials, in the research of the fulfilment of the resulted of learning of all the students.

The teaching methodologies will impart , to be necessary, to the telematic means that put the disposal of the teaching staff, in addition to the documentation facilitated through FAITIC and other platforms, email, etc.

When it was not possible to presential sesions, in the measure of the possible, will prevail the contained theorists by telematic means as well as those contents of practices of resolution of problems, classroom of computing, and others, that can be virtuals or developed pole students of way guided, tried keep the presential stop the experimental practices of laboratory, always that the groups fulfil with the rule established in the moment by the authorities in sanitary subject and of security. In the case of no power be imparted of form presential, those contents no virtuals will impart or by others (autonomous work guided, etc.) Enabling achieve equally the competitions associated it they. The titorships will be able to developed indistinctly of form presential (always that it was possible to guarantee the sanitary measures) or telematic (and email and others) respecting or adapting the schedules of titorships due. it will do a adecuacion methodological to the students of risk, facilitating him additional specific information, to accredit that can not have access to the contained imparted of conventional form.

Additional information envelope to evaluation: they will keep those proofs that already come realizing of telematic form and, in the measure of the possible, will keep the proofs presentials to the normative valid medic. The proofs will develop of form presential except Resolution Reitoral that indicate that they owe do of form non-presential, realizing gave way through the distinct tools put the disposal of the teaching staff. Those proofs no-don of telematic form by others (deliveries of

autonomous work guided, etc.)
