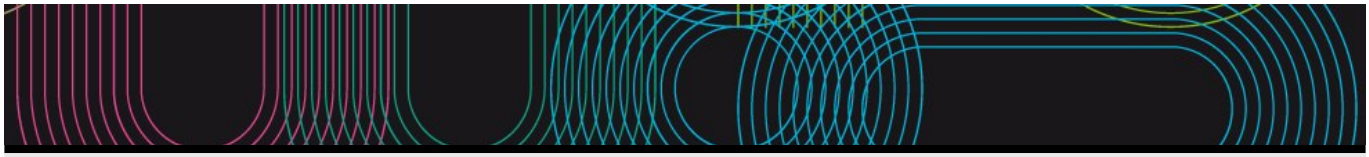

IDENTIFYING DATA				
Photovoltaic Power Electronics				
Subject	Photovoltaic Power Electronics			
Code	V05M145V01330			
Study programme	Máster Universitario en Ingeniería de Telecomunicación			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	5	Optional	2nd	1st
Teaching language	Spanish Galician			
Department				
Coordinator	Doval Gandoy, Jesús			
Lecturers	Doval Gandoy, Jesús			
E-mail	jdoval@uvigo.es			
Web	http://moovi.uvigo.gal			
General description	The subject describes the basic concepts of control and power electronic converters used in photovoltaic systems.			

Training and Learning Results	
Code	
A2	CB2 Students must apply their knowledge and ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study.
B4	CG4 Capacity for mathematical modeling, calculation and simulation in technological centers and engineering companies, particularly in research, development and innovation tasks in all areas related to Telecommunication Engineering and associated multidisciplinary fields.
B8	CG8 Ability to apply acquired knowledge and to solve problems in new or unfamiliar environments within broader and multidiscipline contexts, being able to integrate knowledge.
C28	CE28/SE1 Capacity of technology integration of photovoltaic conversion for power systems of Telecommunication Engineering.

Expected results from this subject	Training and Learning Results
Knowledge of power conversion technologies used in photovoltaic systems.	A2 B4 B8 C28
Knowledge of control techniques of electronic power converters used in photovoltaic systems.	A2 B4 B8 C28

Contents	
Topic	
Chapter 1: Introduction to photovoltaic systems	Photovoltaic effect. Electrical characteristics of photovoltaic cells. Temperature dependence. Irradiation dependence. Electrical connection. Shadow effect.
Chapter 2: Topologies of power electronics converters in photovoltaics.	Electrical configuration photovoltaic cells. Topologies of power electronics converters.
Chapter 3: Control of photovoltaic inverters.	Control of stand-alone photovoltaic inverters. Control of grid-connected photovoltaic inverters. Synchronisation. Maximum power point tracking.

Chapter 4: Regulations and Standards in power electronics photovoltaics systems.	International regulations: IEEE, IEC, VDE, EN. Power quality, ride-through, anti-islanding.

Planning

	Class hours	Hours outside the classroom	Total hours
Laboratory practical	10	31	41
Problem solving	5	16	21
Lecturing	15	48	63

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

Methodologies

	Description
Laboratory practical	Application of the knowledge to particular situations and acquisition of basic skills related with the topic. Competencies: A2, B4, B8, C28.
Problem solving	Formulation of problems and/or exercises related with the topic. The student has to develop the correct solutions by means of applying routines, the application of formulas or algorithms, the application of procedures of transformation of the available information and the interpretation of the results. Competencies: A2, B4, B8, C28.
Lecturing	The professor presents the contents on the subject: theoretical basis and/or guidelines of the work to be developed by the students. Competencies: A2, B4, B8, C28.

Personalized assistance

Methodologies	Description
Lecturing	The professor will attend personally doubts and queries of the students, on the study of theoretical concepts, on exercises or on practices of laboratory. The students will have occasion to attend personal tutorials at the professor office. The tutorial hours will be published at the beginning of the semester in the website of the subject. (www.moovi.uvigo.gal)
Laboratory practical	The professor will attend personally doubts and queries of the students, on the study of theoretical concepts, on exercises or on practices of laboratory. The students will have occasion to attend personal tutorials at the professor office. The tutorial hours will be published at the beginning of the semester in the website of the subject. (www.moovi.uvigo.gal)
Problem solving	The professor will attend personally doubts and queries of the students, on the study of theoretical concepts, on exercises or on practices of laboratory. The students will have occasion to attend personal tutorials at the professor office. The tutorial hours will be published at the beginning of the semester in the website of the subject. (www.moovi.uvigo.gal)

Assessment

	Description	Qualification	Training and Learning Results		
Laboratory practical	Development of the practices of laboratory.	33	A2	B4 B8	C28
Problem solving	Resolution of exercises proposed	33	A2	B4 B8	C28
Lecturing	Theoretical concepts.	34	A2	B4 B8	C28

Other comments on the Evaluation

For the ordinary and extraordinary exam, it will be possible to choose between continuous assessment and global assessment. Students that select global assessment should notify this to the teachers during the first month of classes of the subject.

1. Continuous evaluation

The continuous evaluation consists in the evaluation of the tasks proposed by the professor along the course. The students will execute the tasks and will deliver a report of each one of the tasks. The professor may ask students questions about the tasks carried out in order to assess the knowledge acquired.

The professor will score the students from their work in the developed tasks and from the reports.

The marks will be valid only for the current academic course. It is understood that the student chooses the continuous evaluation when he/she presents at least one task. His/her qualification will be the one of continuous evaluation.

2. Global assessment

The final examination is for students that do not participate in the continuous evaluation. It consists of theoretical questions, problems and exercises that will evaluate the knowledge of the student in the topic. The examination date will be established by the head of the Faculty.

3.Extraordinary exam

There is an extraordinary exam to pass the subject. The student will have to pass an exam with questions, problems and exercises that will evaluate the knowledge of the student in the topic. The examination date will be established by the head of the Faculty.This examination is the same for all the students, have followed or no the continuous evaluation.

Sources of information

Basic Bibliography

Remus Teodorescu, Marco Liserre, Pedro Rodríguez, **Grid Converters for Photovoltaic and Wind Power Systems**, John Wiley & Sons, Ltd.,

Complementary Bibliography

Ned Mohan, Tore M. Undeland, William P. Robbins, **Power Electronics: Converters, Applications, and Design**, John Wiley & Sons, Ltd.,

Andrés Barrado Bautista, Antonio Lázaro Blanco, **Problemas de electrónica de potencia**, Pearson Educación,

Recommendations