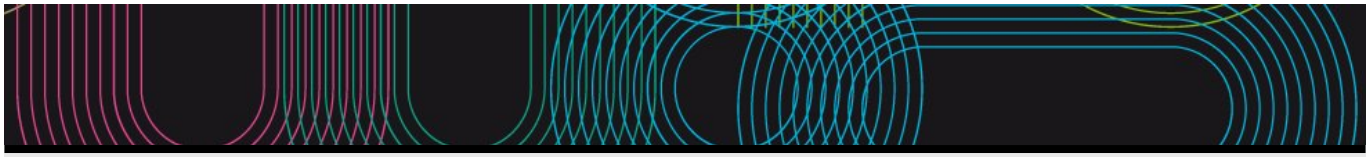

IDENTIFYING DATA				
(*)Tecnoloxía láser				
Subject	(*)Tecnoloxía láser			
Code	V12G320V01908			
Study programme	(*)Grao en Enxeñaría Eléctrica			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	4th	2nd
Teaching language	Spanish			
Department				
Coordinator	Pou Saracho, Juan María			
Lecturers	Lusquiños Rodríguez, Fernando Pou Saracho, Juan María Trillo Yáñez, María Cristina Val García, Jesús del			
E-mail	jpou@uvigo.es			
Web				
General description	(*)Introduction to laser technology and its applications for undergraduate students of the industrial field.			

Competencies	
Code	
A10	(*)CG10 Capacidade para traballar nun medio multilingüe e multidisciplinar.
B10	(*)CS2 Aprendizaxe e traballo autónomos.

Learning aims		
Expected results from this subject	Training and Learning Results	
(*)	A10	B10

Contents	
Topic	
Chapter 1.- INTRODUCTION	1. Electromagnetic waves in the vacuum and in the matter. 2. Laser radiation. 3. Properties of the laser radiation.
Chapter 2.- BASICS	1. Photons and energy level diagrams. 2. Spontaneous emission of electromagnetic radiation. 3. Population inversion. 4. Stimulated emission. 5. Amplification.
Chapter 3. COMPONENTS OF A LASER	1. Active medium 2. Excitation mechanisms. 3. Feedback mechanisms. 4. Optical cavity. 5. Exit device.
Chapter 4. TYPES OF LASER	1. Gas lasers 2. Solid-state lasers 3. Diode lasers. 4. Other lasers.

Chapter 5. OPTICAL COMPONENTS AND SYSTEMS	1. Spherical lenses. 2. optical centre of a lens. 3. Thin lenses. Ray tracing. 4. Thin lenses coupling. 5. Mirrors. 6. Filters. 7. OPtical fibers.
Chapter 6. INDUSTRIAL APPLICATIONS	1. Introduction to laser materials processing 2. Introduction to laser cutting and drilling. 3. Introduction to laser welding. 4. Introduction to laser marking. 5. Introduction to laser surface treatments.

Planning

	Class hours	Hours outside the classroom	Total hours
Laboratory practises	18	30.6	48.6
Master Session	32.5	65	97.5
Long answer tests and development	1.7	0	1.7
Reports / memories of practice	1.9	0	1.9
Short answer tests	0.3	0	0.3

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

Methodologies

	Description
Laboratory practises	Activities of application of the knowledge to specific situations and of acquisition of basic and practical skills related to the matter object of study. They will be developped in the laboratories of industrial applications of the lasers of the EEI.
Master Session	Exhibition on the part of the teacher of the contents on the matter object of study. Exhibition of real cases of application of the laser technology in the industry.

Personalized attention

Methodologies	Description
Laboratory practises	

Assessment

	Description	Qualification
Long answer tests and development	The examination will consist of five questions of equal value. Four of them will correspond to the contents of theory and the fifth one to the contents seen in the laboratory practices.	70
Reports / memories of practice	The evaluation of the laboratory practices will be carried out by means of the qualification of the corresponding practice reports.	20
Short answer tests	During the course there will be carried out a test of follow-up of the subject that will consist of two questions of equal value.	10

Other comments on the Evaluation

If some student was resigning officially the continuous assessment that is carried out by means of the test of follow-up of the subject, the final note would be calculated by the following formula:

(0.8 x Exam qualification) + (0.2 x Practices qualification).

It is mandatory to carry ut the laboratory parctices in order to pass the subject.

Sources of information

UNDERSTANDING LASERS: AN ENTRY-LEVEL GUIDE. Jeff Hecht. New York, EE.UU., IEEE, 2008.

UNDERSTANDING LASER TECHNOLOGY: AN INTUITIVE INTRODUCTION TO BASIC AND ADVANCED LASER CONCEPTS, Breck Hitz, Tulsa, EE.UU., PennWell.

LASER MATERIALS PROCESSING. W. Steen, J. Mazumder, Ed. Springer. 2010.

Recommendations