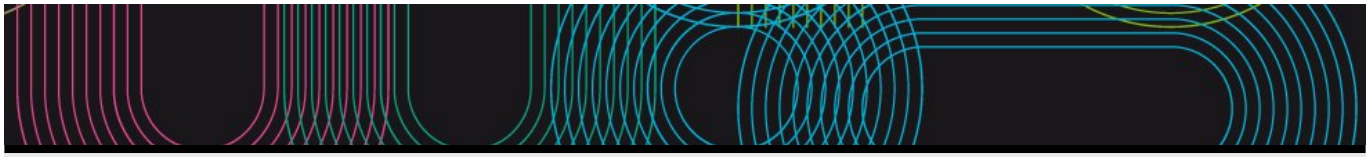

IDENTIFYING DATA				
Laser technology				
Subject	Laser technology			
Code	V12G350V01908			
Study programme	Grado en Ingeniería en Química Industrial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	4th	2nd
Teaching language	Spanish English			
Department				
Coordinator	Pou Saracho, Juan María			
Lecturers	Pou Saracho, Juan María			
E-mail	jpou@uvigo.es			
Web				
General description	(*)Introduction to laser technology and its applications for undergraduate students of the industrial field.			

Skills	
Code	
B10	CG10 Ability to work in a multidisciplinary and multilingual environment.
D10	CT10 Self learning and work.

Learning outcomes		
Expected results from this subject	Training and Learning Results	
- Know the physical principles in which it bases the operation of a laser and his parts. - Know the main properties of a laser and relate them with the potential applications. - Know the different types of lasers differentiating his specific characteristics. - Know the main applications of the technology laser in the industry.	B10	D10

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 practical	18	30.6	48.6
Lecturing	32.5	65	97.5
Essay questions exam	1.7	0	1.7
Report of practices, practicum and external practices	1.9	0	1.9
Problem and/or exercise solving	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 practical	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.
Lecturing	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 assistance

Methodologies	Description
Laboratory practical	

Assessment

	Description	Qualification	Training and Learning Results	
Essay questions exam	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	B10	D10
Report of practices, practicum and external practices	The evaluation of the laboratory practices will be carried out by means of the qualification of the corresponding practice reports.	20	B10	D10
Problem and/or exercise solving	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	B10	D10

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 out the laboratory parctices in order to pass the subject. It is mandatory to attend 75% of the theory lessons to pass the subject.

Ethical commitment: it is expected an adequate ethical behaviour of the student. In case of detecting unethical behaviour (copying, plagiarism, unauthorized use of electronic devices, etc.) shall be deemed that the student does not meet the requirements for passing the subject. In this case, the overall rating in the current academic year will be Fail (0.0).

The use of any electronic device for the assessment tests is not allowed unless explicitly authorized. The fact of introducing unauthorized electronic device in the examination room will be considered reason for not passing the subject in the current academic year and will hold overall rating (0.0).

Sources of information

Basic Bibliography

Jeff Hecht, **UNDERSTANDING LASERS: AN ENTRY-LEVEL GUIDE**, IEEE, 2008

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

Complementary Bibliography

Recommendations

Other comments

Requirements: To register for this module the student must have passed or be registered for all the modules of the previous year.

In case of discrepancies, the spanish version (castellano) will prevail.

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 adecuation 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.)