



IDENTIFYING DATA

Laser Technology

Subject	Laser Technology			
Code	V12G330V01908			
Study programme	(*)Grao en Enxeñaría en Electrónica Industrial e Automática			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	4th	2nd
Teaching language				
Department				
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Lecturers	Pou Saracho, Juan María Quintero Martínez, Félix Trillo Yáñez, María Cristina			
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Web				
General description	Introduction to the technology laser and his applications for the students of the degrees of the industrial branch.			

Competencies

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	
<input type="checkbox"/> Know the physical principles in which it bases the operation of a laser and his parts.	B10	D10
<input type="checkbox"/> Know the main properties of a laser and relate them with the potential applications.		
<input type="checkbox"/> Know the different types of lasers differentiating his specific characteristics.		
<input type="checkbox"/> Know the main applications of the technology laser in the industry.		

Contents

Topic	
SUBJECT 1.- INTRODUCTION	1. Electromagnetic waves in the empty and in the matter. 2. Radiation laser. 3. Properties of the radiation laser.
SUBJECT 2.- BASIC PRINCIPLES	1. Photons and diagrams of levels of energy. 2. Spontaneous broadcast of electromagnetic radiation. 3. Investment of population. 4. Broadcast stimulated. 5. Amplification.
SUBJECT 3.- PARTS OF A LASER	1. Half active. 2. Mechanisms of excitation. 3. Mechanism of *realimentación. 4. Optical cavity. 5. Device of exit.
SUBJECT 4.- TYPES OF LASERS	1. Lasers of gas. 2. Lasers of solid state. 3. Lasers of diode. 4. Other lasers.

SUBJECT 5.- COMPONENTS And OPTICAL SYSTEMS

1. Spherical lens.
2. Optical centre of a lens.
3. Thin lens. Traced of rays.
4. Association of thin lens.
5. Mirrors.
6. Filters.
7. Optical fibre.

SUBJECT 6.- INDUSTRIAL APPLICATIONS

1. Introduction to the processing of materials with laser
2. Introduction to the cut and *taladrado by means of laser.
3. Introduction to the welding by means of laser.
4. Introduction to the marked by means of laser.
5. Introduction to the superficial treatments by means of laser.

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 knowledges to concrete situations and of acquisition of basic skills and *procedimentales related with the matter object of study. They develop in the laboratories of industrial applications of the lasers of the *EEI.
Master Session	Exhibition by part of the professor of the contents on the matter object of study. Exhibition of real cases of application of the technology laser in the industry.

Personalized attention

Methodologies	Description
Laboratory practises	They will attend individually the questions that can arise during the development of the practices.

Assessment

	Description	Qualification	Training and Learning Results	
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 to the contents seen in the classes of practices of laboratory.	70	B10	D10
Reports / memories of practice	The evaluation of the practices of laboratory will carry out by means of the qualification of the corresponding reports of practices.	20	B10	D10
Short answer tests	During the course will carry out a proof of follow-up of the *asignatura that will consist of two questions of equal value.	10	B10	D10

Other comments on the Evaluation

If some student renounced officially to the continuous evaluation that carries out by means of the proof of follow-up of the *asignatura, the final note would establish of the following form: $(0.8 \times \text{Notices examination}) + (0.2 \times \text{practical note})$. To approve the *asignatura is indispensable to realise the practices of laboratory. To approve the *asignatura is indispensable to assist to 75% of the classes of theory (session *magistral).

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

Other comments

Requirements: To enrol in this matter is necessary to have surpassed or be enrolled of all the matters of the inferior courses to the course in which it is *emplazada this matter.

In case of discrepancies, will prevail the version in Spanish of this guide.
