



IDENTIFYING DATA

(*)Técnicas avanzadas no invasivas en enxeñaría biomédica: Aplicación do láser en medicina

Subject	(*)Técnicas avanzadas no invasivas en enxeñaría biomédica: Aplicación do láser en medicina			
Code	V04M192V01208			
Study programme	Máster Universitario en Ingeniería Biomédica			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	4.5	Optional	1st	2nd
Teaching language	Spanish			
Department				
Coordinator	Pou Saracho, Juan María			
Lecturers	Pou Saracho, Juan María			
E-mail	jpou@uvigo.es			
Web				
General description	This matter offers to the future biomedical engineers a vision of the paper of the non-invasive techniques and the laser in modern medicine.			

Training and Learning Results

Code	
A3	That students are able to integrate knowledge and handle complexity and formulate judgments based on information that was incomplete or limited, include reflecting on social and ethical responsibilities linked to the application of their knowledge and judgments.
B6	Capacity for handling specifications, regulations and mandatory standards.

Expected results from this subject

Expected results from this subject	Training and Learning Results
To know advanced non-invasive techniques in the field of biomedical engineering	B6
To know applications of lasers in medicine	B6
To apply knowledge of non-invasive techniques and laser techniques in the field of biomedical engineering	A3 B6

Contents

Topic	
SUBJECT 1.- INTRODUCTION	Introduction to advanced non-invasive techniques in biomedical engineering Analysis of advanced non-invasive techniques Introduction to the laser
SUBJECT 2.- BASIC PRINCIPLES	Functioning of a laser source Main parts of a laser source Guiding and focalizing a laser beam

SUBJECT 3.- TYPES OF LASERS USED IN MEDICINE Gas lasers

Solid state lasers

Diode lasers

Other lasers

SUBJECT 4.- SAFETY

Security in the utilisation of laser sources laser in medicine

Potential ocular damages

Potential damages in the skin

Safety regulations

Measures of control and prevention

SUBJECT 5.- MAIN APPLICATIONS OF THE LASER IN MEDICINE

Applications of the laser in ophthalmology

Applications of the laser in dermatology

Applications of the laser in otorhinolaryngology

Applications of the laser in urology

Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	24	48	72
Laboratory practical	12	24	36
Objective questions exam	1.5	0	1.5
Report of practices, practicum and external practices	3	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
Lecturing	Presentation of the contents on the matter object of study by the professors of the subject. Presentation of real cases of application of the laser technology in medicine.
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 developed in the premises of the University Hospital Complex of Vigo.

Personalized assistance

Methodologies	Description
Lecturing	The professor, during the exhibition of the theoretical classes, will clarify in individual form and/or collectively all the doubts that can have the student on the matter object of study.
Laboratory practical	The professor, during the development of the practical class of laboratory, will solve the doubts that the student may have related to the matter under study.

Assessment

	Description	Qualification	Training and Learning Results
Objective questions exam	The exam will consist in an individual examination.	60	A3 B6
Report of practices, practicum and external practices	Work made in team but evaluated individually.	40	

Other comments on the Evaluation

To pass the subject, a minimum note of 2 points out of 10 must be achieved. This applies in the individual exams as well as in the team work report.

In the second opportunity, only the students that fail to pass the subject will be evaluated.

Ethical commitment

It is expected that the students conduct themselves in a suitable ethical manner. In the case to detect a non ethical

behaviour (copy, plagiarism, utilisation of unauthorised electronic devices, and others) it will be considered that the student does not achieve the necessary requirements to pass the subject. In this case the global qualification in the present academic year will be of fail (0.0). During the evaluation exam any electronic device will be allowed, with the exception that explicit permission is given by the professor in charge. The fact to enter an unauthorised electronic device in the classroom of examination will be considered reason of failing the subject in the present academic course and the global qualification will be fail (0.0).

Sources of information

Basic Bibliography

Jeff Hecht, **Understanding Lasers: An Entry-Level Guide, 4th Edition**, Wiley, 2018

Markolf H. Niemz, **Laser-Tissue Interactions Fundamentals and Applications**, Springer, 2007

Complementary Bibliography

Helena Jelínková, **Lasers for Medical Applications Diagnostics, Therapy and Surgery**, Woodhead Publishing, 2013

Recommendations

Other comments

To enrol in this subject it is suggested to compare the schedules of this subject with others, with the objective to avoid lecturing overlap. The continuous evaluation will not be applied if the students can not follow the lectures due to overlapping with other subjects.

Likewise the sending of electronic messages or the utilisation of the mobile telephone during the development of the lectures implies the expulsion from the classroom.

The student that does not abide with that established in the previous paragraph not only will be expelled from the classroom, but he/she will lose his/her possibility to follow the continuous evaluation.

The original learning guide is that written in Spanish. In case of discrepancies, the spanish version of this learning guide will prevail.