[GFK008] Photonics

GENERAL INFORMATION

Studies	DEGREE IN ENGINEERING PHYSICS APPLIED TO INDUSTRY			**Subject**	Key Technologies
Semester	1	**Course**	4	**Mention / Field of specialisation**	???
Character	COMPULSORY				
Plan	2022	**Modality**	Face-to-face	**Language**	ENGLISH
Credits	4,5	**Hours/week**	0	**Total hours**	38 class hours + 74.5 non-class hours = **112.5 total hours**

2030 AGENDA GOALS

PROFESSORS

LASA ALONSO, JON

REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
Mathematical Modelling	*(No previous knowledge required)*
Electromagnetism II	
Optics and Artificial Vision	

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
GFR304 - Understand fundamental concepts of electromagnetic optics, as well as their application in engineering and telecommunications	x	x		4,5
			Total:	4,5

KC: Knowledge or Content / SK: Skills / AB: Abilities

SECONDARY LEARNING RESULTS

RGF408 **[!]** ***Comprende el funcionamiento de las guías de ondas y conoce el papel que desempeñan tanto en las comunicaciones clásicas como en las cuánticas***

LEARNING ACTIVITIES	CH	NCH	TH
Personal study and flexible development of concepts and subjects using active dynamics, to foster more meaningful learning	6 h.	19,5 h.	25,5 h.
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	6 h.	15 h.	21 h.
Computer simulation exercises, individually and/or in teams	6 h.	4 h.	10 h.

EVALUATION SYSTEM	W
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	25%
Individual written and/or oral tests or individual coding/programming tests	75%

MAKE-UP MECHANISMS
Individual written and/or oral tests or individual coding/programming tests

CH - Class hours: 18 h.
NCH - Non-class hours: 38,5 h.
TH - Total hours: 56,5 h.

RGF407 **[!]** ***Comprende las interacciones fundamentales de las ondas electromagnéticas con distintos tipos de materiales y los regímenes en los que pueden ocurrir***

LEARNING ACTIVITIES	CH	NCH	TH
Personal study and flexible development of concepts and subjects using active dynamics, to foster more meaningful learning	5 h.	15 h.	20 h.

Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	5 h.	11 h.	16 h.
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams	5 h.	5 h.	10 h.
Computer simulation exercises, individually and/or in teams	5 h.	5 h.	10 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	75%	Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems
Individual written and/or oral tests or individual coding/programming tests	25%	

CH - Class hours: 20 h.
NCH - Non-class hours: 36 h.
TH - Total hours: 56 h.

CONTENTS

1. Electromagnetic waves and light
2. Matter from the electromagnetic perspective
3. Linear light-matter interactions
    1. Scattering theory
    2. Diffraction theory
4. Waveguides and optical fibers
5. Introduction to quantum optics

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources	Bibliography
Moodle Platform	https://labur.eus/CmLIN
Video projections	
Computer practical training	
Slides of the subject	
Presentations by external Lecturers	