Master in PHOTONICS BCN

(http://www.photonics.masters.upc.edu)

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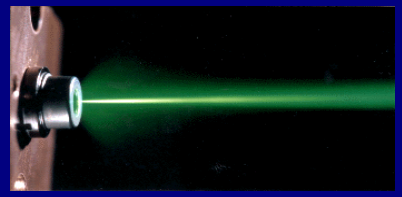
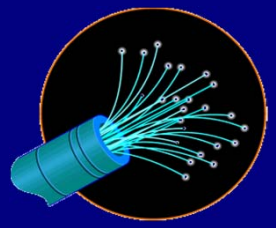
Optics & Photonics

- A traditional area of science and technology evolving very fast (one of the most relevant branches for the XXIth Century)



- **Imaging and vision**
- **Sensors and** new **light sources** (lasers, …)

- **Biophotonics** and **medicine:** instruments for diagnosis and treatment (ophthalmology)



- **Optical communications** (fibers, …)
- New **materials** (nanophotonics, …) and **processing** (cutting, 3D printing,…)

- **Energy & environment** (LED lighting, solar panels,…)

- **Quantum and nonlinear optics**

XXI century: - 8 Nobel Prize in Physics
- 2 Nobel Prize in Chemistry

} **related to PHOTONICS**

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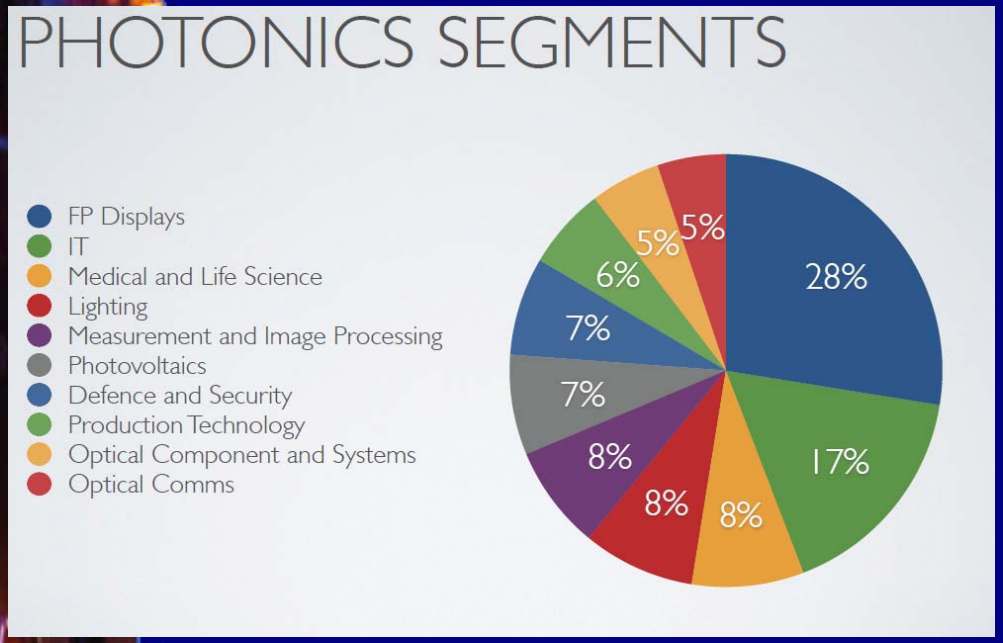
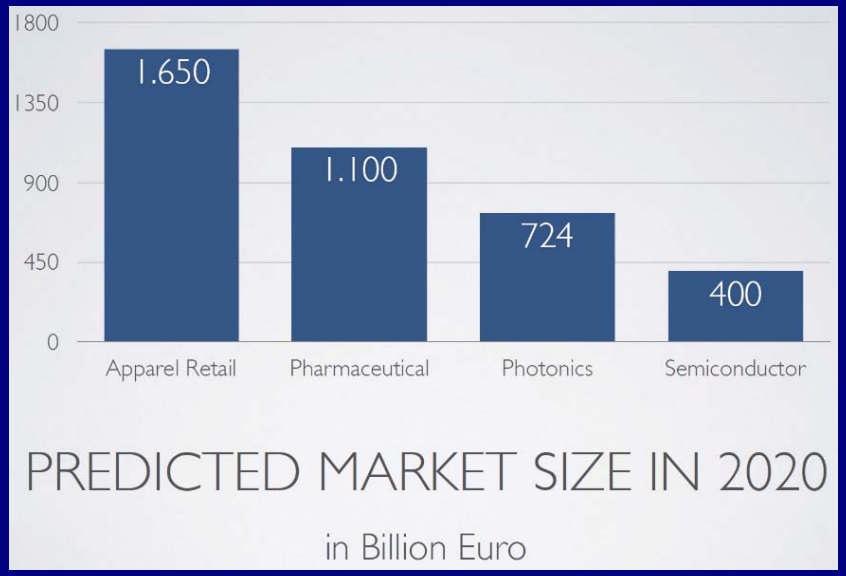
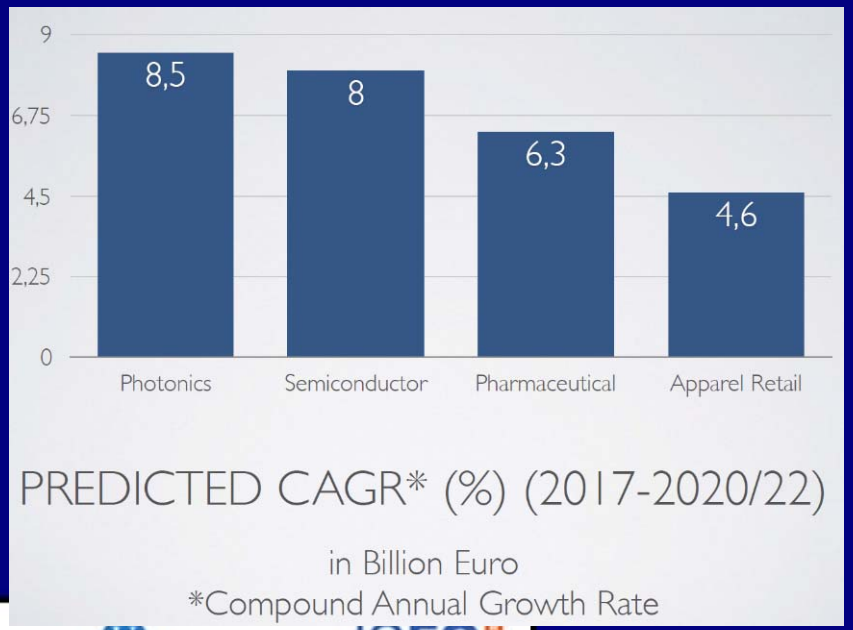
Photonics in Science and Technology

Highly multidisciplinary







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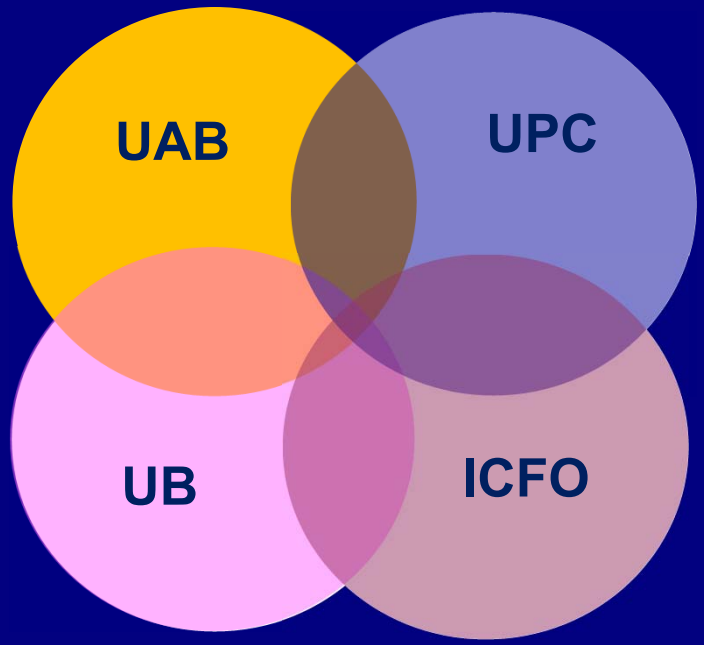
MSc Photonics – "PHOTONICS BCN"

- 15 years ago, researchers covering different fields of Photonics in Barcelona area (UPC, UAB and UB) and in the Institute of Photonic Science (ICFO), decided to put together their complementary expertise to offer a joint Master in Photonics.
- The program started in 2007
- Official 60 ECTS (1 year) Spanish Degree.
- All courses are taught in English.



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Masters in Photonics – "Photonics BCN"

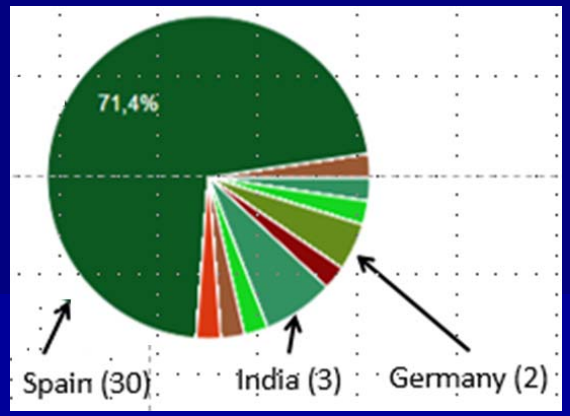
OBJECTIVES

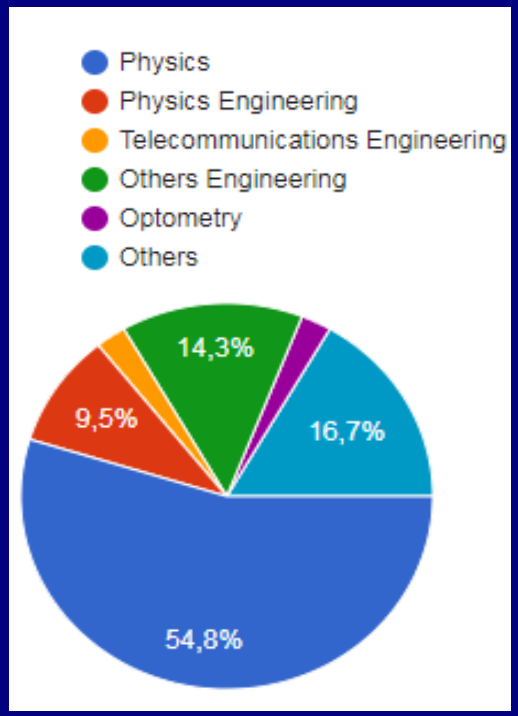
- Provide knowledge and training in different areas of PHOTONICS
- Flexibility: the student can choose from many elective courses, to get either general training, or more specialized training in different possible areas.
- Develop competences and skills that will help the student to initiate a research (PhD thesis) or a professional carrier in a company.

ADDRESSED TO

- Bachelor in Physics, Physiscal Engineering
- Bachelor in Telecommunication and Electronics Engineers
- Bachelor in Optics and Optometry
- Other degrees

- 30-40 students





Compulsory courses — 20 ECTS

Fundamentals of Photonics — 10 ECTS

- **Introduction to photonics (Optics and Lasers)** — 5 ECTS
- **Beam Propagation and Fourier Optics** — 5 ECTS

Applied Photonics & Transversal Skills — 10 ECTS

- **Photonics Laboratory** — 5 ECTS
- **Business and Patents in Photonics** (enterpreneurship, contacts with companies) — 5 ECTS

Elective Courses — 24 ECTS

Quantum Optics (QUANTOP) — 18 ECTS

Biophotonics and Imaging (BIOIMA) — 12 ECTS

Materials and Nanophotonics (MATNANO) — 12 ECTS

Telecomm. & Photonics Circuits (TELPHO) — 12 ECTS

Optical Engineering (OPTENG) — 18 ECTS

Master Thesis — 16 ECTS

Total: 60 ECTS

Biophotonics and imaging — 12 ECTS

Experimental optical techniques in biology	3
Active and spectral imaging	3
Visual optics and biophotonics	3
Image processing in biophotonics	3

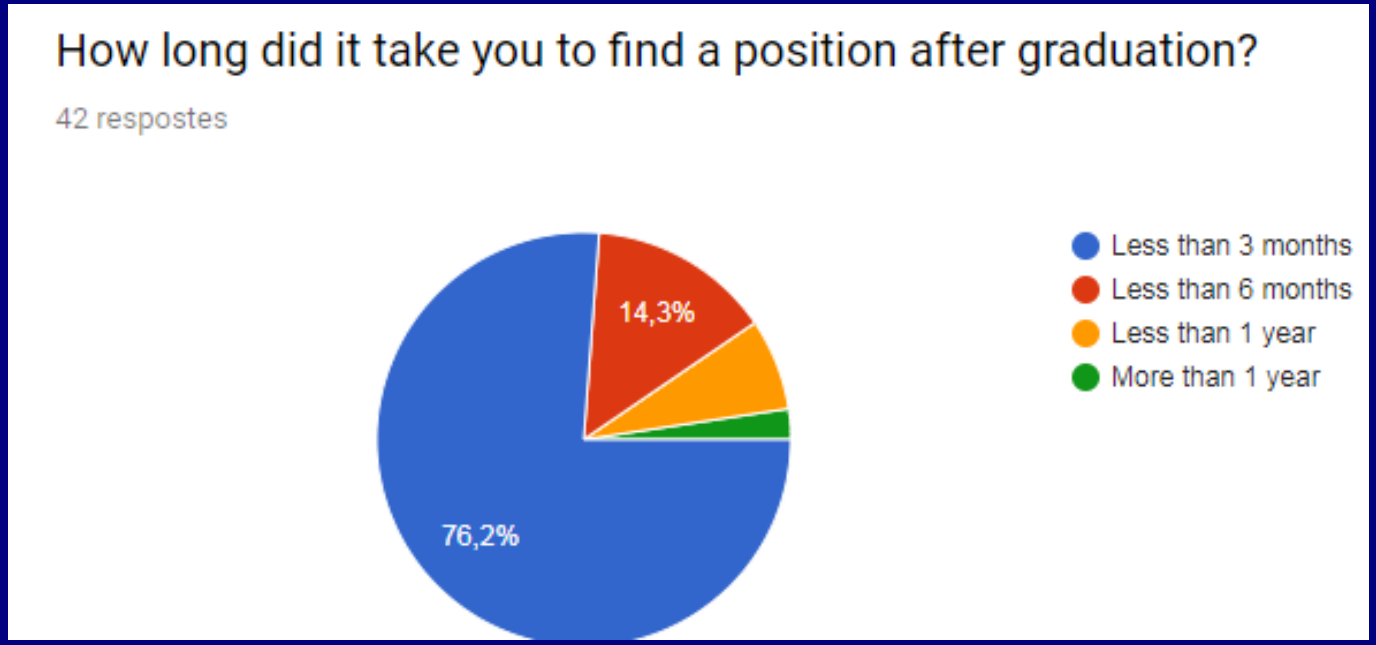
Optical Engineering — 18 ECTS

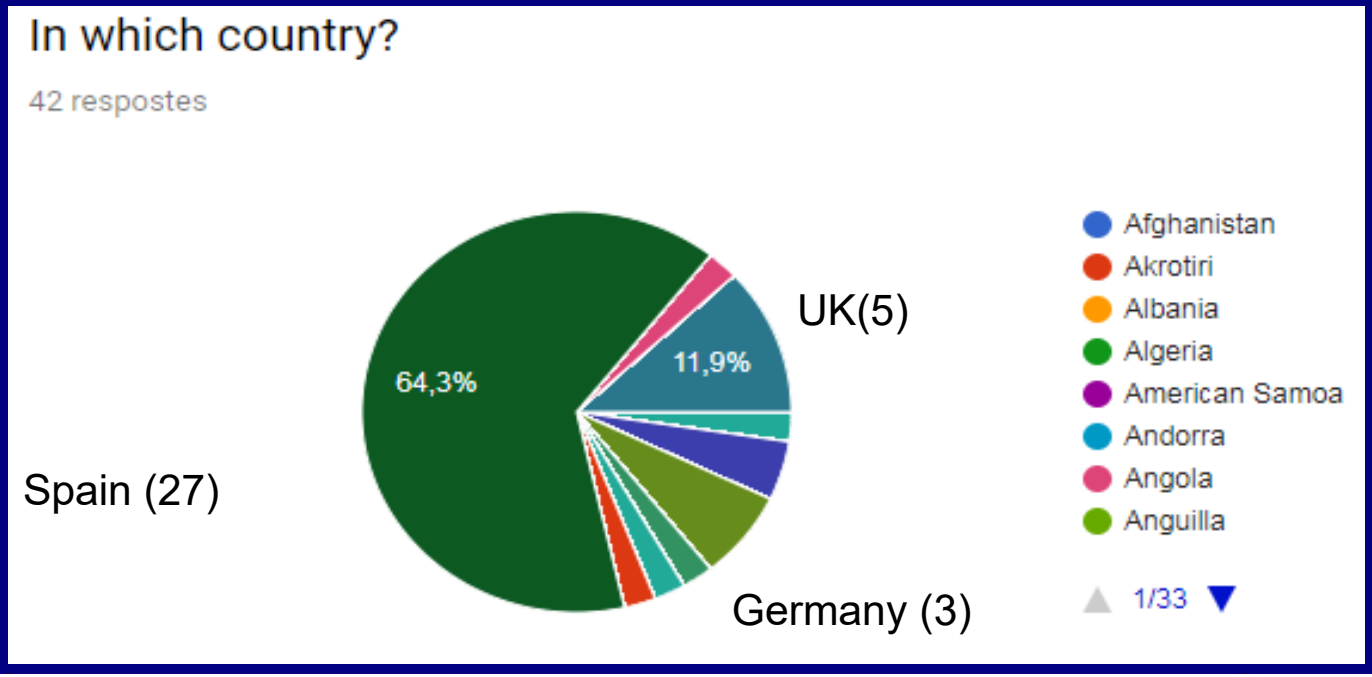
Laser systems and applications	3
Managing light with devices	3
Measuring with light (optical metrology)	3
Optical design	3
Laser Applications in remote sensing (LIDAR)	3

TIMETABLE

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
10:00-11:00					SEMINARS (A23M)
11:00-12:00					
12:00-13:00					
13:00-14:00					
14:00-15:00	INTRODUCTION TO PHOTONICS (A43M)	Quantum Optics (A43M) / Active and Spectral Imaging (A44M)	INTRODUCTION TO PHOTONICS (A43M)	Optoelectronics & Photovoltaic Technology (A43M)	Quantum Optics (A43M) / Active and Spectral Imaging (A44M)
15:00-16:00					
16:00-17:00	BEAM PROPAGATION AND FOURIER OPTICS (A43M)	Measuring with light (A43M)	BEAM PROPAGATION AND FOURIER OPTICS (A43M)	Measuring with light (A43M)	Photonics Materials and Metamaterials (A43M)
17:00-18:00					
18:00-19:00	Optoelectronics & Photovoltaic Technology (A43M)	Machine Learning on Classical and Quantum Data (A43M)	Photonics Materials and Metamaterials (A43M)	Machine Learning on Classical and Quantum Data (A43M)	BEAM PROPAGATION AND FOURIER OPTICS (A43M)
19:00-20:00					

Careers in Photonics *Statistics*





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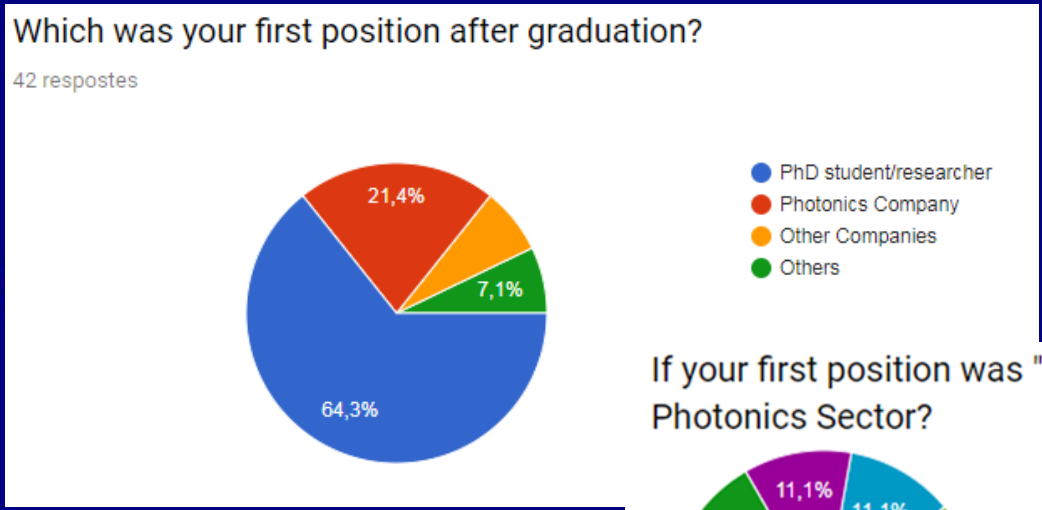
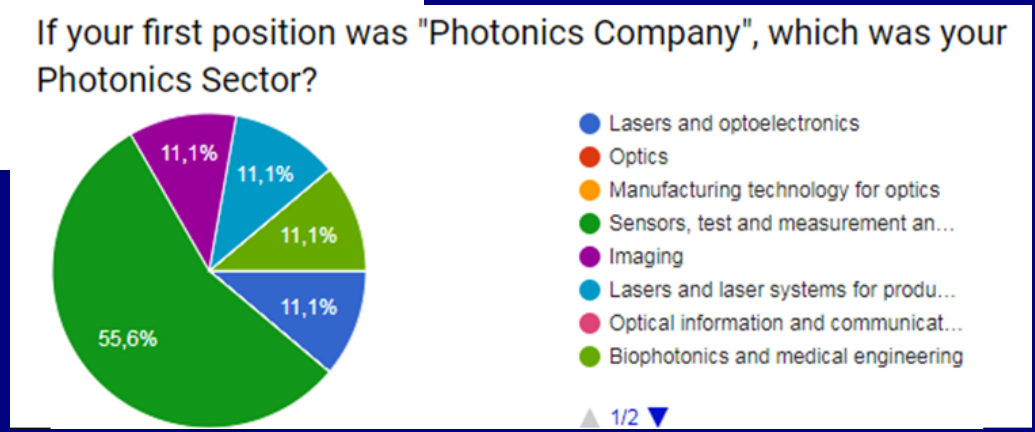
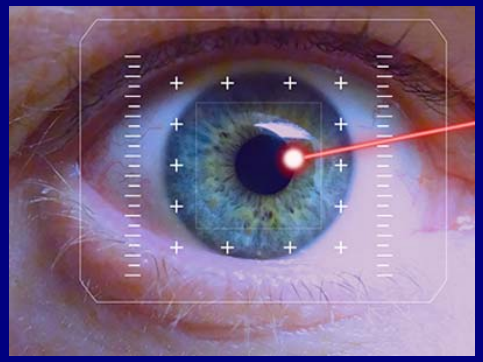
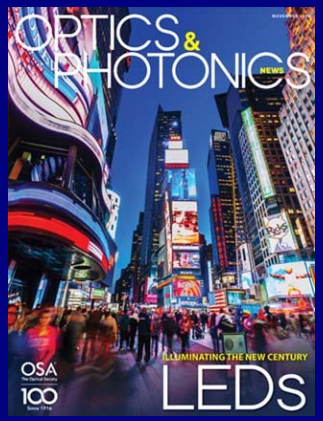
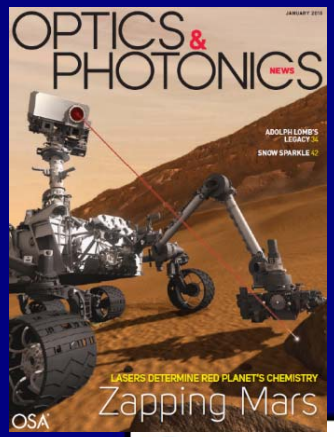






MSc in Photonics





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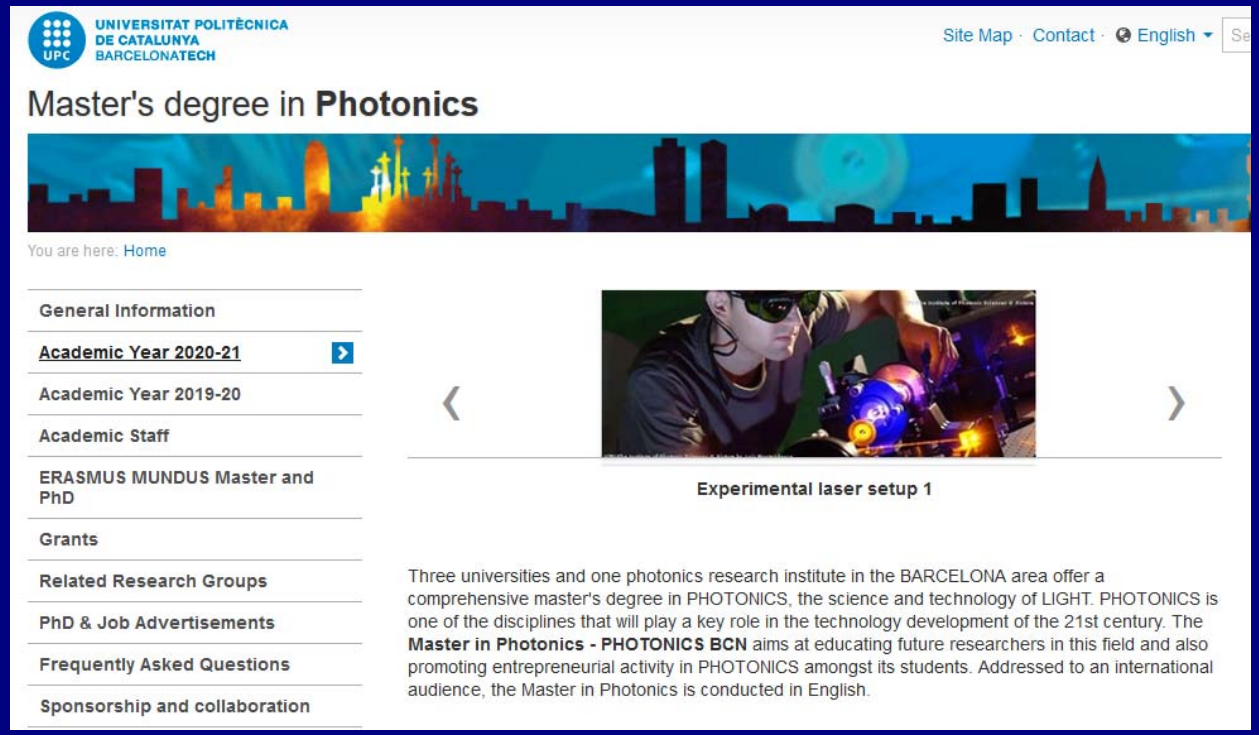

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