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 XXI\textsuperscript{th} 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
Photonics in Science and Technology

Highly multidisciplinary

PHOTONICS SEGMENTS
- FP Displays: 28%
- IT: 5%
- Medical and Life Science: 5%
- Lighting: 7%
- Measurement and Image Processing: 6%
- Photovoltaics: 7%
- Defence and Security: 17%
- Production Technology: 8%
- Optical Component and Systems: 8%
- Optical Comm: 8%

PREDICTED MARKET SIZE IN 2020 in Billion Euro
- Apparel Retail: 1,650
- Pharmaceutical: 1,100
- Photonics: 724
- Semiconductor: 400

PREDICTED CAGR* (%) (2017-2020/22) in Billion Euro
- Photonics: 8.5
- Semiconductor: 8
- Pharmaceutical: 6.3
- Apparel Retail: 4.6

*Compound Annual Growth Rate
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.
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

<table>
<thead>
<tr>
<th>Course</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fundamentals of Photonics</td>
<td>10</td>
</tr>
<tr>
<td>• Introduction to photonics (Optics and Lasers)</td>
<td>5</td>
</tr>
<tr>
<td>• Beam Propagation and Fourier Optics</td>
<td>5</td>
</tr>
</tbody>
</table>

### Applied Photonics & Transversal Skills 10 ECTS

<table>
<thead>
<tr>
<th>Course</th>
<th>ECTS</th>
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</thead>
<tbody>
<tr>
<td>• Photonics Laboratory</td>
<td>5</td>
</tr>
<tr>
<td>• Business and Patents in Photonics (entrepreneurship, contacts with companies)</td>
<td>5</td>
</tr>
</tbody>
</table>

### Elective Courses 24 ECTS

<table>
<thead>
<tr>
<th>Course</th>
<th>ECTS</th>
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<tbody>
<tr>
<td>Quantum Optics (QUANTOP)</td>
<td>18</td>
</tr>
<tr>
<td>Biophotonics and Imaging (BIOIMA)</td>
<td>12</td>
</tr>
<tr>
<td>Materials and Nanophotonics (MATNANO)</td>
<td>12</td>
</tr>
<tr>
<td>Telecomm. &amp; Photonics Circuits (TELPHO)</td>
<td>12</td>
</tr>
<tr>
<td>Optical Engineering (OPTENG)</td>
<td>18</td>
</tr>
</tbody>
</table>

### 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
Careers in Photonics  Statistics

How long did it take you to find a position after graduation?
42 responses

In which country?
42 responses

UK (5)
Spain (27)
Germany (3)
Careers in Photonics  Statistics

Which was your first position after graduation?
42 responses

- 21.4% PhD student/researcher
- 7.1% Photonics Company
- 54.3% Other Companies
- 11.1% Others

If your first position was "Photonics Company", which was your Photonics Sector?

- 55.6% Lasers and optoelectronics
- 11.1% Optics
- 11.1% Manufacturing technology for optics
- 11.1% Sensors, test and measurement applications
- 11.1% Imaging
- 11.1% Lasers and laser systems for production and measurement
- 11.1% Optical information and communication technologies
- 11.1% Biophotonics and medical engineering

1/2
MSc in Photonics

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

Master's degree in Photonics

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General Information
Academic Year 2020-21
Academic Year 2019-20
Academic Staff
ERASMUS MUNDUS Master and PhD
Grants
Related Research Groups
PhD & Job Advertisements
Frequently Asked Questions
Sponsorship and collaboration

Three universities and one photonics research institute in the BARCELONA area offer a comprehensive master's degree in PHOTONICS. The science and technology of LIGHT, PHOTONICS is one of the disciplines that will play a key role in the technology development of the 21st century. The Master in Photonics - PHOTONICS BGN aims at educating future researchers in this field and also promoting entrepreneurial activity in PHOTONICS amongst its students. Addressed to an international audience, the Master in Photonics is conducted in English.

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