



## 230552 – BUSINE – Business and Patents in Photonics

<b>Coordinating unit:</b>	230 - ETSETB Barcelona School of Telecommunications Engineering
<b>Teaching unit:</b>	731 - OO Department of Optics and Optometry
<b>Academic year:</b>	2015 - 2016
<b>Degree:</b>	Master's Degree in Photonics Erasmus Mundus Master's Degree in Photonics Engineering, Nanophotonics and Biophotonics
<b>ECTS credits:</b> 5	<b>Teaching languages:</b> English

### Academic staff

<b>Coordinator:</b>	<a href="#">Santiago Royo</a> (UPC)	<a href="mailto:royo@oo.upc.edu">royo@oo.upc.edu</a>
<b>Other professors:</b>	<a href="#">Carles Puente</a> (UPC)	<a href="mailto:carles.puente@upc.edu">carles.puente@upc.edu</a>

### Degree competences to which the subject contributes

#### Transversal:

1. **EFFECTIVE USE OF INFORMATION RESOURCES:** Managing the acquisition, structuring, analysis and display of data and information in the chosen area of specialisation and critically assessing the results obtained.
2. **FOREIGN LANGUAGE:** Achieving a level of spoken and written proficiency in a foreign language, preferably English, that meets the needs of the profession and the labour market.
3. **ENTREPRENEURSHIP AND INNOVATION:** Being aware of and understanding how companies are organised and the principles that govern their activity, and being able to understand employment regulations and the relationships between planning, industrial and commercial strategies, quality and profit.
4. **TEAMWORK:** Being able to work in an interdisciplinary team, whether as a member or as a leader, with the aim of contributing to projects pragmatically and responsibly and making commitments in view of the resources that are available.

### Teaching methodology

#### Lectures

#### Activities:

- By half of the course a marketplace session will be organized. In this session the participants will submit ideas that could become potential business opportunities. During this session participants will team up to form working groups.
- At the end of the course, during the week of special activities, the working groups will make a presentation of the photonics-related business that they have analyzed along the course in a simulated environment in which Venture Capitalists are seeking for good investing opportunities.

### Objectives and short description of the course

The purpose of this course is to provide the students with the fundamental entrepreneurial and management skills required to successfully start and develop a technology based business. Special attention is paid to train engineers and scientists who are interested on the practical use of photonics technology in the development of photonic inventions and innovations, including their intellectual property right protection through patents.

The second purpose is to incite business awareness and to explore how scientific and technical concepts might be translated into real-life industrial applications.

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Program will include lectures given by entrepreneurs that have the experience of starting-up a spin-off company. Participants will be also exposed to a highly interactive process of analysis and discussion, including case studies and small-group learning activities, such as the analysis of a business opportunity. Fundamental concepts on the effective writing and use of patents in business will be also discussed through several examples of photonic patents and company cases that have effectively used patents to leverage a successful technology based business.

### Study load

Total learning time: 125h	Hours large group:	37.5h	30%
	Hours medium group:	0h	0%
	Hours small group:	0h	0%
	Guided activity:	3.75h	3%
	Self study:	83.75h	67%

### Course index

- 1. Business in Photonics**
  - 1.1. Entrepreneurship and Intrapreneurship.
  - 1.2. Starting and Building a High-Tech Venture. From Idea to Enterprise. Critical Success Factors.
  - 1.3. Organization of a technology based company.
  - 1.4. Strategic and Product Marketing
  - 1.5. Photonics Business and Photonics Clusters.
  - 1.6. Basic of Start-up Finance and Accounting.
  - 1.7. Gathering Resources. Venture Capital.
- 2. Patents in Photonics**
  - 2.1. Innovation and Entrepreneurship. An Intellectual Property based Economy.
  - 2.2. Introduction to Patents in Technology and Business. Patent Information Management. Examples of Patents in Photonics.
  - 2.3. Introduction to Patent Engineering: Structure and Scope of Protection of a Patent. Design of Claims and Specification. The US and the EPO patent systems.
  - 2.4. Strategy in the Patent and Technology Business Ecosystem.

### Qualification system

As an Individual:

- Weekly Assignments, participation in lectures, workshops and case studies (15%)
- Short final Exam (15%)

As a Team:

- Course Project: Opportunity Analysis in Photonics (35%)
- Course Project: Patent Writing in Photonics (35%)

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### Bibliography

- Richard C. Dorf and Thomas H. Byers (2008), "Technology Ventures. From Idea to Enterprise", McGraw Hill Higher Education, ISBN 9780073350431
- Randy Komisar (2001), "The Monk and the Riddle", Harvard Business School Press, ISBN 1578511402
- Melissa A. Schilling (2008)
- Strategic Management of Technological Innovation, McGraw Hill Higher Education, ISBN 9780073210582
- Harnessing Light. Optical Science and Engineering for the 21st Century
- National Academy Press (1998), ISBN 0309059917
- MONA, Merging Optics and Nanotechnologies (2008). UE Report
- Guy Kawasaki (2004), "The Art of the Start", Penguin Group (USA)
- Guy Kawasaki (2011), "Enchantment", Penguin Group (USA)
- B. DeMatteis, A. Gibbs, M. Neustel, "The Patent Writer", SquareOne Publishers, New York, 2006
- J.T.Verdeyen, "Laser Electronics", Prentice Hall, 3rd Edition, 1994.
- USPTO, "Manual of Patent Examining Procedure (MPEP)", <http://www.uspto.gov/web/offices/pac/mpep/>
- EPO, "Guidelines for Examination in the European Patent Office", <http://www.epo.org/patents/law/legal-texts/guidelines.html>
- Examples of photonics patents at Google Patents, <http://www.google.com/patents>
- Examples of photonics patents at Esp@cenet, <http://ep.espacenet.com/>

Updated topical specific bibliography and teaching materials will be distributed through the ATENEA web platform.