230552 - BUSINE - Business and Patents in Photonics

Coordinating unit: 230 - ETSETB - Barcelona School of Telecommunications Engineering
Teaching unit: 731 - OO - Department of Optics and Optometry
Academic year: 2017
Degree: MASTER’S DEGREE IN PHOTONICS (Syllabus 2013). (Teaching unit Compulsory)
ERASMUS MUNDUS MASTER’S DEGREE IN PHOTONICS ENGINEERING, NANOPHOTONICS AND BIOPHOTONICS (Syllabus 2010). (Teaching unit Optional)
ECTS credits: 5
Teaching languages: English

Teaching staff
Coordinator: Santiago Royo (UPC, coord.)
Others: Carles Puente (UPC)

Opening hours
Timetable: royo@oo.upc.edu
carles.puente@upc.edu

Degree competences to which the subject contributes

Basic:
CB8. (ENG) Que los estudiantes sean capaces de integrar conocimientos y enfrentarse a la complejidad de formular juicios a partir de una información que, siendo incompleta o limitada, incluya reflexiones sobre las responsabilidades sociales y éticas vinculadas a la aplicación de sus conocimientos y juicio.
CB9. (ENG) Que los estudiantes sepan comunicar sus conclusiones y los conocimientos y razones últimas que las sustentan a públicos especializados y no especializados de un modo claro y sin ambigüedades

Specific:
CE7. (ENG) Màster en Fotònica:
Capacidad de entender la ingeniería óptica como una actividad económica y empresarial considerando, entre otros, aspectos sociales, éticos y de sostenibilidad
CE8. (ENG) Màster en Fotònica:
Comprender la importancia de las patentes como base de la empresa tecnológica y tener la capacidad para entender y redactar una patente en el ámbito de la fotónica

Generical:
CG1. (ENG) Màster en Fotònica:
Capacidad para proyectar, diseñar e implantar productos, procesos, servicios e instalaciones en algunos ámbitos de la fotònica como los relacionados con la ingeniería fotònica, la nanofotònica, la óptica cuántica, las telecomunicaciones y la biofotònica
CG3. (ENG) Màster en Fotònica:
Capacidad para la dirección técnica y dirección de proyectos de investigación, desarrollo e innovación, en centros de investigación, empresas y centros tecnológicos, en el ámbito de la Fotònica

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.
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.
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.
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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

Learning objectives of the subject

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 in 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.

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.

BIBLIOGRAPHY:
· Melissa A. Schilling (2008)
· Harnessing Light. Optical Science and Engineering for the 21st Century
· 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)
· 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.
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**Study load**

<table>
<thead>
<tr>
<th>Total learning time: 125h</th>
<th>Hours large group: 37h 30m</th>
<th>30.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours medium group: 0h</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>Hours small group: 0h</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>Guided activities: 3h 45m</td>
<td>3.00%</td>
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<tr>
<td></td>
<td>Self study: 83h 45m</td>
<td>67.00%</td>
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</tbody>
</table>

**Content**

### 1. Business in Photonics

**Learning time:** 18h 45m

**Description:**
1.1. Entrepreneurship and Intrapreneurship.
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.

### 2. Patents in Photonics

**Learning time:** 18h 45m

**Description:**
2.1. Innovation and Entrepreneurship. An Intellectual Property based Economy.
Planning of activities

<table>
<thead>
<tr>
<th>Market Place</th>
<th>Hours: 1h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory classes: 1h</td>
<td></td>
</tr>
</tbody>
</table>

**Description:**
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.

<table>
<thead>
<tr>
<th>Presentation of a Photonics-related business</th>
<th>Hours: 2h 48m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory classes: 2h 48m</td>
<td></td>
</tr>
</tbody>
</table>

**Description:**
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.

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%)
Bibliography

Basic:


Others resources:

Hyperlink

http://www.google.com/patents
Examples of photonics patents at Google Patents

http://ep.espacenet.com/
-Examples of photonics patents at Esp@cenet

http://www.epo.org/patents/law/legal-texts/guidelines
Guidelines for Examination in the European Patent Office

http://www.uspto.gov/web/offices/pac/mpep/
Manual of Patent Examining Procedure (MPEP)