

TAM - Technology Assets Management

Coordinator: Carles Puente Baliarda
Lecturer: Carles Puente Baliarda
University: Universitat Politècnica de Catalunya
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1. CONTENT

Course Objectives

To train engineers and scientists in the management of technology assets, research and engineering teams. To understand the rules of the international patent system and learn how to develop a patent portfolio and a patenting strategy to secure and monetize the technology value of a corporation. To learn the basic technology and patent licensing models and the related business trade-offs. To develop the basic skills to plan and manage a technology and product roadmap, understanding the role of a technology department in a small or large corporation and its fit and interaction with other departments and government bodies within the organization. To review several strategies on how to introduce an innovation into the market, from the traditional product development cycle to a pure intellectual property licensing model.

Who should attend

This course is directed to train engineers and scientist aiming to develop a technology management career in a high-tech company, whether a start-up or a large corporation.

Course Description

Background: Technology and talent are the main assets for a technology based company; however, a disruptive technology alone does not guarantee a business success. Properly managing such two key assets, a proprietary technology and the talented team behind it, becomes a key success factor when addressing a highly competitive market environment. This course aims to provide the basic tools and skills to future technology managers to develop a mid and long-term technology development and innovation strategy which is aligned with the business goals of a corporation.

Part-I – Background, Basic Knowledge and Skills

Technology Based Companies and a Knowledge Based Economy - What is a technology based company? The technology and the team as key assets of the corporation. Structure and organization of a technology based company. Examples of technology companies in the telecommunications/electronics space (Qualcomm, ARM, Intel, Thomson, Rambus, Tessera, InterDigital, IBM, Immersion, WiLAN). Overview of Intellectual Property (IP) protection. The patent system worldwide: why patenting?

Project Oriented Management – The project as a business and engineering management tool. The project steering committee. The project leader and the project team. Project management tools: project definition, project planning, budget and resources planning and tracking, tracking tools (action item list, meeting minutes, reporting), closing meetings. Project planning examples with Microsoft Project.

Introduction to Patent Prosecution – What is a patent? The patent as a technical document. The patent as a legal document. The patent as a negative right. Data structure of a patent and patent application document. Searches in patent databases. General requirements for patentability. The US patent system vs. the European patent system. Novelty, Non-obviousness/Inventive-step in US/Europe. Patent prosecution in the US and EPO. Patent prosecution in other offices world-wide.

Introduction to Patent Engineering – The invention report as the link between the engineering and legal teams. Technical content and structure of a patent document: background, specification, drawings and claims. Independent and dependent claims. Specification support according to EPC and USPTO practices. Claim look-up tables. Claim charts. Basic patent drafting for engineers. Technology and patent review examples.

Part-II – Technology and Patent Strategies and Organization

Technology and Product Innovation –The technology roadmap. The product roadmap. The project funnel. Product development cycle and product development pipeline. Intellectual property considerations in product development: intellectual property surveillance and product marking.

Patent Prosecution Strategies – Cost analysis of patent prosecution. Filing international patent (PCT) applications. Filing provisional applications. Divisional applications in the EPO and USPTO. Continuation and Continuation in Part applications. What to file, where and when. The patent as an intellectual property (IP) product. The IP product pipeline. Patent portfolio management. Monitoring your patent portfolio. Budgeting a corporate patent portfolio investment. Budgeting examples with Microsoft Project.

The Knowledge Management System (KMS) – The KMS as a productivity tool for technology based companies. The KMS as knowledge storage tool: internal projects and reports. The KMS as prior-art and state of the art surveillance tool. The KMS as a patent docketing and document management tool. The ‘duty of candor’ in the US and the Information Disclosure Statement procedure in front of the USPTO. Examples of software tools for implementing a KMS. Information and document workflows and quality system related procedures.

Part-III – Technology and Patent Based Business Models

Technology and Patent Licensing Models – Product, design, technology and patent licensing. Enabling technologies and the ‘carrot’ patent license model. Examples of ‘carrot’ licensing. Infringed technologies and the ‘stick’ license model. Examples of ‘stick’ licensing. Choosing the right licensee in the value chain. Pricing models and technology and patent value. The Entire Market Value Rule in the US. Patents as defensive business tools for large corporations. Cross-licensing. Patents as a key business tool for high-tech companies.

The ‘carrot’ licensing model – Product and design licensing vs. patent licensing. Engineering services and the non-recurring expenses (NRE) model. Enabling technology and patent pricing and licensing. Bundling an IP product pack. Partnership programs. The pilot program. Confidentiality and Non Disclosure Agreements (NDA). The Memorandum of Understanding (MoU). Client-attorney privileged information and the Common Interest Agreement (CIA) in the US.

The ‘stick’ licensing model – Patent enforcement in the US and Europe. Choosing a venue for patent enforcement. The Federal Circuit and the International Trade Commission in the US. Injunctive relief. Lost profits and past damages. Patent marking of products. Royalty awards. Timings and stages of litigation. Litigation as a defensive tool: declaratory judgements in the US.

Licensing agreements – Dimensions of a licensing agreement: defining your IP product. Exclusivity. Rights to Sublicensing. Reservation of Rights. Term and termination. Royalties and other considerations. Prosecution and maintenance. Infringement. Indemnification. Representation and warranties. Disclaimers.

2. Pedagogic Targets

1. To make engineers and scientists conscious on the **potential value of a technology asset** beyond its use in a traditional product development program.
2. To provide engineers and scientists with some **basic tools and insights** in the art of technology management.
3. To get engineers and scientists confident and **familiar in managing patent information**.
4. To get engineers and scientists **understand the purpose of patenting** and to provide them an insight on how to make an **effective use of patents in a business context**.
5. To get engineers and scientist **familiar in the reading and wording of patent documents** and interpreting its basic **scope of protection**.
6. To help engineers and scientists in **protecting through patents broad technology concepts** rather than narrow product lines.
7. To provide engineers and scientists with the **tools to budget and monitor a patent portfolio** and help in making a strategic plan for a patent asset development.
8. To provide engineers and scientists with the basic concepts on **technology and patent licensing**.
9. To provide engineers and scientists with a perspective on **how to set up a technology and IP group** inside a company whether a start-up or a large corporation.
10. To train engineers and scientists in the **reading of technical documents** (patents) in different fields where the student is not necessarily an expert.

3. References

1. D. Mock, "The Qualcomm Equation", AMACOM, New York, 2005
2. B. DeMatteis, A. Gibbs, M. Neustel, "The Patent Writer", SquareOne Publishers, New York, 2006
3. K.T.Ulrich, S.D.Eppinger, "Product Design and Development", McGraw Hill International Edition, New York, 2008.
4. G. Lowery , T. Stover, "Managing Projects With Microsoft Project 2000: For Windows", John Wiley and Sons, 2001
5. M.S. Holmes, "Patent Licensing", Practising Law Institute, New York, 2004.
6. M.E. McGrath, "Product Strategy for Hight Tech Companies", McGrawHill, New York, 2001.
7. USPTO, "Manual of Patent Examining Procedure (MPEP)",
<http://www.uspto.gov/web/offices/pac/mpep/>
8. EPO, "Guidelines for Examination in the European Patent Office",
<http://www.epo.org/patents/law/legal-texts/guidelines.html>

4. Course Program

Sessions

Part-I - Background, Basic Knowledge and Skills

Session #1 .- Introduction to Technology Assets Management – Example of a Technology Company (TCE#1). What is a technology company? A technology and IP based business model. Overview of TAM course. Parts of TAM. Objectives of TAM. Who should take TAM? Why TAM: technology and IP related careers.

Session #2.- An Intellectual Property (IP) based economy. Overview of IP protection: patents, trademarks, copy rights, industrial designs, integrated circuit layouts. Basis for the patent system: why patenting? The patent system worldwide: national filings and rules, patent cooperation treaty. IP related information sources (websites, patent and trademark offices, associations).

Session #3.- Organization of a Technology Company. Organization chart. The General Shareholders Meeting, Board of Directors and Executive Committee. Executives, roles, teams and functions in a Technology company. Matrix organization models: departments and business units. Professional roles in a Technology company. Examples.

Session #4.- Project oriented management. Project definition. The project as an engineering tool. The project as business organization tool. The project steering committee. The project sponsor, the project leader and the project team. Project management tools: project description, action item lists, meeting minutes, project reports. Project information system. Team building, team meetings: kick-off, follow-up and closing meetings.

Session #5.- Project planning with Microsoft Project (I). Task definition and hierarchy. Task length and interdependence. Task margin and critical path. Project optimization. Example.

Session #6.- Project planning with Microsoft Project (II). Task resources and assignment. Workload assessment and task redistribution. Costs and budgeting. Cost tracking. Example.

Session #7.- Introduction to Patent Prosecution (I) - Introduction to patent prosecution. What is a patent? The patent as a technical document. The patent as a legal document. The patent as a negative right. The WIPO, EPO and USPTO websites. Data structure of a patent and patent application document. Filing, priority, publication and granting dates. Patent and patent application

numbers. Searches in patent databases. General requirements for patentability. Patent specification and claims.

Session #8.- Introduction to Patent Engineering (I) – Structure of a patent document. Patent specification: background, summary of the invention, description of the preferred embodiments/best mode, list of figures, drawings and claims. Claim structure: limiting features and scope of protection. Claim features and novelty. Independent and dependent claims. Claim hierarchy and protection level graphs. The onion layer structure. Multidependency. Examples.

Part-II – Technology and Patent Strategies and Organization

Session #9.- Introduction to Patent Prosecution (II) : The European Patent Convention (EPC) - The European Patent Office (EPO) and the European patent system: European patent application vs. national filings. Requirements for patentability: novelty, inventive-step and industrial application. Exclusions from patentability. Priority and novelty. Inventive step and the problem solution approach. Guidelines for examination at the EPO. Prosecution at the EPO: office actions, oral proceedings, and oppositions. *Innovation & Patenting Project - The Paper Airplane Competition (I): Introduction and kick-off.*

Session #10.- Introduction to Patent Prosecution (III): The US patent system - The US Patent and Trademark Office (USPTO). Requirements for patentability: novelty, non-obviousness and usefulness. Priority in the US: first to file vs. first to invent. Non-obviousness. The Manual of Patent Examination Procedure (MPEP). Prosecution at the USPTO: office actions, information disclosure statement (IDS). Patent reexamination.

Session #11.- Introduction to Patent Engineering (II): Introduction to Claim drafting - Independent claims in the EPO and in the US. Structure of a claim: preamble, limiting features and the two-part form. Basic and special types of claims (Markush, means plus function, product by process,..). Limiting words: 'comprising', 'including' vs. 'consisting of'. Support according to EPO and USPTO rules. Independent and dependent claims: scope and validity. Claims as the skeleton of a patent specification. Examples.

Session #12.- Introduction to Patent Engineering (III) : Claim drafting session – *Students will read a patent specification on an IT system (e.g. a compact disk system based on a laser diode) and prepare a set of independent and dependent claims. Two students will present simultaneously their claim proposals. The class will discuss the scope of protection of both sets and support according to the US and EPO perspectives.*

Session #13-#14.- Introduction to Patent Engineering (IV) : Patent specification drafting. Technology protection vs. product protection. Bottom-up process and technology definition: from embodiments to abstraction. Stages and flow graph in patent specification drafting. The laser/oscillator example. Invention

description: top-down process. The 'grenade fruit' strategy: creating fallback positions. Multi-faced protection contours maximize scope of protection, prevent design-around 'holes' and maximize validity likelihood. *Example: a He-Ne laser 'invention' is presented, together with a letter from the inventor. Students become involved in defining terms for the invention according to the patent specification drafting flowgraph. Write proposals on the blackboard and compare them.*

Session #15.- Introduction to Patent Engineering (V) - Scope of protection and patent infringement. Literal infringement. The Doctrine of Equivalents. The FESTO case in the US. Claim charts. *The Paper Airplane Competition (II): Determine the Winning Airplane.*

Session #16.- Technology and Product Innovation – The technology roadmap. The product roadmap. The R&D programme. The project funnel. Product development cycle and product development pipeline. The IP product development cycle. The patent report as the link between the engineering and the legal/IP teams. The patent prototype: provisional patent applications. Filing Divisional applications in the EPO and USPTO. Filing Continuations and Continuations in Part.

Session #17.- Patent Prosecution and Portfolio Management (I) – Patent prosecution phases: from filing to granting and maintenance. Filing through the Patent Cooperation Treaty (PCT) route. Why filing PCT applications? Costs related to the PCT applications. Cost estimation in US, EP, JP, CN, IN, KR, RU, MX, BR. Patent budget with Microsoft Project. Budgeting an international patent portfolio.

Session #18.- Patent Prosecution and Portfolio Management (II) : Cost optimisation – When is worth filing a patent? Corporate patent review and ranking systems. What world regions should one file a patent in? Examples in the telecom, electronics and pharmaceutical industry. When is the right moment to file a patent? The provisional patent application: cost and filing. Example of patent portfolio cost optimisation. Filing Divisional applications in the EPO and USPTO. Filing Continuations and Continuations in Part. Cost analysis of Continuations and Divisionals. The patent portfolio as a core asset of a technology company.

Session #19.- Patent Prosecution and Portfolio Management (III): The 'duty of candor' in the US and the Information Disclosure Statement procedure in front of the USPTO. The Knowledge Management System (KMS). The KMS as a productivity tool for technology based companies. The KMS as knowledge storage tool: internal projects and reports. The KMS as prior-art and state of the art surveillance tool. The KMS as a patent docketing and document management tool. Examples of software tools for implementing a KMS. Information and document workflows and quality system related procedures. Intellectual property considerations in product development: IP surveillance and product marking.

Part-III – Technology and Patent Based Business Models

Session #20.- Technology and Patent Licensing Models – Product, design, technology and patent licensing. Dimensions of a licensing agreement: defining your IP product. Choosing the right licensee in the value chain. Pricing models and technology and patent value. The Entire Market Value Rule in the US. Strategic use of IP in technology corporations. Patents as defensive business tools for large corporations. Cross-licensing. Patents as a key business tool for high-tech companies. Enabling technologies and the ‘carrot’ patent license model. Examples of ‘carrot’ licensing. Infringed technologies and the ‘stick’ license model. Examples of ‘stick’ licensing.

Session #21.- The ‘carrot’ licensing model – Product and design licensing vs. patent licensing. Engineering services and the non-recurring expenses (NRE) model. Enabling technology and patent pricing and licensing. Bundling an IP product pack. Partnership programs. The pilot program. Confidentiality and Non Disclosure Agreements (NDA). The Memorandum of Understanding (MoU). Client-attorney privileged information and the Common Interest Agreement (CIA) in the US.

Session #22.- The ‘stick’ licensing model – Patent enforcement in the US and Europe. Choosing a venue for patent enforcement. The Federal Circuit and the International Trade Commission in the US. Injunctive relief. Lost profits and past damages. Patent marking of products. Royalty awards. Timings and stages of litigation. Litigation as a defensive tool: declaratory judgements in the US.

Session #23. – Licensing Agreements – Dimensions of a licensing agreement. Exclusivity. Rights to Sublicensing. Reservation of Rights. Term and termination. Royalties and other considerations. Prosecution and maintenance. Infringement. Indemnification. Representation and warranties. Disclaimers.

Session #24.- Review Term Projects (I) – *The paper airplane project (III): Determine the winning of the contest (the patent owner of the winning airplane).*

Term projects will be based on the research on examples of successful IP/technology licensing business. Other topics related to patent licensing, patent strategies will be covered as well. Work will be carried out in teams of two people and will involve a written memo and an oral presentation for discussion.

Session #25-#26.- Review Term Projects (II) - Term projects will be based on the research on examples of successful IP/technology licensing business. Other topics related to patent licensing, patent strategies will be covered as well. Work will be carried out in teams of two people and will involve a written memo and an oral presentation for discussion.

5. Student Assignments and Projects

Weekly Assignments (3h/week) - At the end of the week (6 out of 13 weeks), students will have to work on an assignment for the following week. Completing and delivering the exercises will be mandatory. Completion of work will be checked, and a few randomly selected assignments will be graded each week. Weekly assignments will be based on:

- Read and comment 'the patent of the week'
- Read selected material from reference books and papers.
- Quest on the content of the week sessions and material.
- Exercises based on the week sessions.

Course Project #1 (15h in 2 weeks - Start 10/3/09) - *Project Planning* - Students will organize in teams of 3-4 people to prepare a detailed project plan and related project management tools. A project leader will be elected within each group and the team will organize to find information about the target product design, manufacturing and marketing. (*Teamwork*)

Course Project #2 (30h in 4 weeks - Start 24/3/09) - *Patent Drafting & Innovation: The paper airplane competition* - Every student is invited to prepare a paper airplane in class and compete for the longest-range airplane. Then students are arranged in teams of two/three, and a time period for improving the plane and 'filing' a patent on the invention is proposed. Entire prior-art is defined as the simplest paper airplane (one-fold). 'First to file' system is proposed. The winner is who owns a patent on the longest-range airplane. The winning team gets 4 extra points in the final exam and a waiver on the homework (except for projects) until the end of the course. (*Teamwork*)

Course Project #3 (15h in 2 weeks - Start 28/4/09) - *Patent Budgeting* - Students will collect the dates of a set of PCT patent applications filed by a tech company in the previous year and will prepare a 20 year budget. Cost analysis and comparison based on several national filing strategies will be carried out. (*Teamwork*)

Course Project #4 (25h in 10 weeks - Start 3/3/09) - *Licensing Business Research* - Students will work in teams of 2-3 people to collect information and study a case related to the IP business: licensing and litigation examples, recent case law and verdicts in the US, papers on IP strategy, etc. Case studies will be presented by each team during the last 3 sessions of the course. (*Teamwork*)

6. Grading

- 20% final exam
- 20% term project
- 30% paper airplane project
 - Winners (teams with exclusion rights) get 4 extra points in final exam.
 - Best airplane builders get 2 extra points in final exam.
- 10% patent budget project
- 10% project planning project
- 10% homework/weekly assignments.