Engineering Tripos Part IIB, 4E1: Innovation & Strategic Management of Intellectual Property, 2025-26

Leader

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Lecturer

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Guest speakers

Speakers from different industries (e.g. senior IP managers) and governmental organisations (e.g. European Patent Office) will complement the academic lectures.

Timing and Structure

Michaelmas term (Monday 14:00 - 16:00). Teaching for this module should take place in-person (unless governmental guidance will prevent this) with a guest speaker potentially joining online (details to be announced on the Moodle page).

Prerequisites

There are no prerequisites for attending this module. However, students will receive pre-reading material covering IP essentials which students are expected to have studied before the third lecture. This pre-reading will equip students with a basic understanding of the different IP rights, such as patents, trademarks, design rights, copyrights, and trade secrets.

Aims

The aims of the course are to:

- Acknowledge the relevance of IP for technology-based companies, particularly in collaborative innovation processes and innovation systems.
- Understand how to manage IP to achieve and maintain competitive advantage.
- Understand how to share IP through different licensing mechanisms, such as for creating sustainable impact.
- Understand techniques/ methods/ approaches for developing IP strategies that support long term business success and create sustainable impact.
- Possess the relevant know how to access and use IP data and analytics to support business related decision making.

Objectives

As specific objectives, by the end of the course students should be able to:

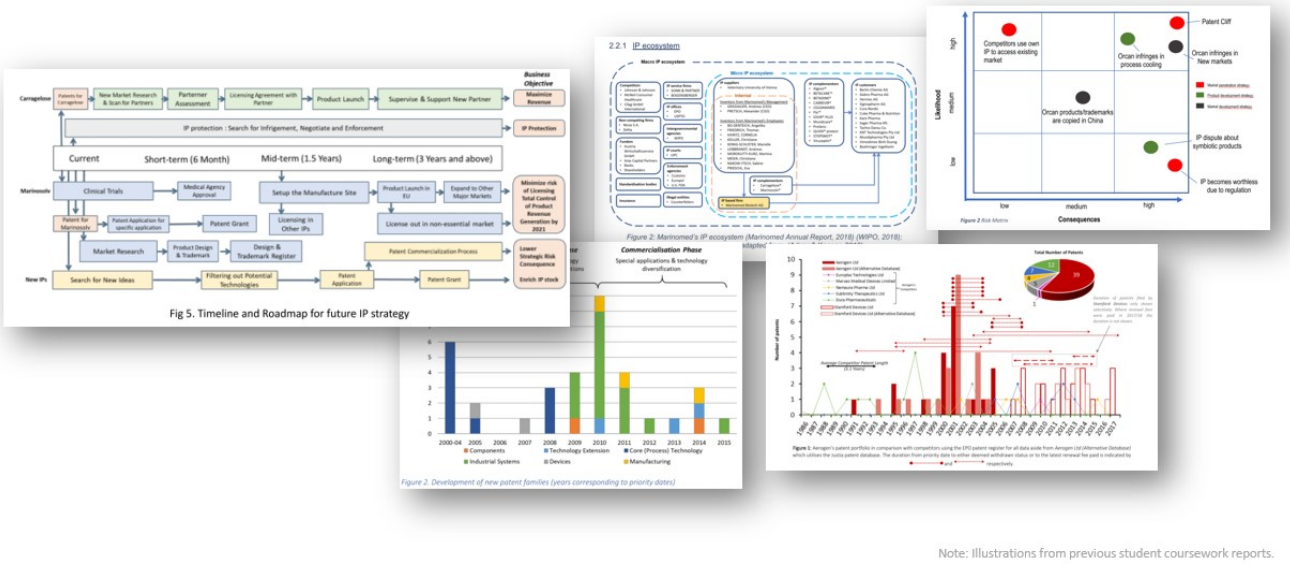
- Appreciate the interdisciplinary nature of IP for technology and innovation management.
- Understand and apply relevant concepts, frameworks, tools, and theories introduced during the module.

- Be aware about business situations in which IP might be important to consider.
- Be enabled to interact with professionals (managers, R&D engineers, lawyers) in IP related business conversations.
- Understand the opportunities that companies can create by strategically managing IP.

Content

Intellectual assets and intellectual (IP) play a pivotal role for today's technology champions and tomorrow's innovators. This module adopts an engineering management perspective on the role and use of IP by innovative companies.

The module builds on the state of the art in strategic IP management thinking for maximizing value appropriation from predominantly technological innovations and collaborative innovation processes. The module focuses on the management of formal IP rights (e.g. patents, trademarks, design rights, copyrights), but also covers the increasingly relevant informal IP (e.g. data/algorithms, know-how, trade secrets). The module particularly emphasises the way how companies use IP to contribute to the sustainable development goals (SDGs) and create sustainable impact, such as by developing green/ clean technologies (e.g. renewable energy, plastic alternatives, meat substitutes) or social impact (e.g. for job creation in low- and middle-income countries).



Note: Illustrations from previous student coursework reports.

By definition, IP is an interdisciplinary subject. IP created by inventors, often engineers or scientists, needs to be managed and valued for decision making by executives and IP lawyers, who act within the scope of the associated legal systems. In the module we adopt an engineering management perspective on IP. Occasionally, however, we also touch on related concepts from law and economics.

During the module we run interactive, in-class exercises, talk about case examples and discuss more in-depth case studies. For instance, we look at the Dolby case study, which is a fascinating example of how a company has evolved its IP strategy over three decades along with changing technological, market and business environments to become one of the world's most successful licensing businesses.

The module examines different approaches to IP strategies across industries. For instance, pharmaceutical companies typically rely on relatively small and focused patent portfolios, while firms in the electronics and ICT sectors typically have larger and more divers IP portfolios. For students to gain an understanding of different IP strategies in different industries, we bring in guest speakers with extensive practical experience (e.g. head of IP, vice presidents, senior IP managers) covering different industries.

Guest speakers from governmental organisations, such as the European Patent Office (EPO) and the World Intellectual Property Organisation (WIPO) join the module to help students understand the role of and functioning of

IP rights systems.

Student feedback:

Topics typically covered in this module include:

Innovation and the need for strategic IP management

- Introduction to IP rights systems
- Digital economy, multi-technology products and IP complexity
- Global challenges and the need for innovation
- The rise of open cumulative innovation, open source and the need for novel approaches to IP
- Incentives to innovate, motives to patent, and the patenting paradox

IP systems, prosecution, litigation

- Formal and informal IP rights (appropriability regimes)
- Patenting features and patent quality
- Patent procedures and renewals
- Ownership and reassignments
- Counterfeiting, infringement and litigation

IP analytics to support decision making

- Patent features that are available for analysing patent data
- Introduction to IP analytics including free and commercial software tools
- Patent databases, search strategies and indicators for analysing patent data (patent landscaping and

mining)
- Approaches for patent landscaping, technology foresight/ intelligence, understanding competitors and identifying emerging/ disruptive technologies
- AI, machine and deep learning approaches for IP analytics

Technology, strategic and economic value as fundamental concepts for effective IP management

- The concept of value and value dimensions (strategic, economic, technological, social)
- The value of data in the AI age
- Established and emerging valuation approaches for IP

Markets for technology and IP licensing

- Supply and demand sides of markets for technologies, innovations and data in the context of open innovation
- Technology market intermediaries, e.g. non-practicing entities
- IP ecosystems
- Licensing models, contracts, methods to determine royalty rates, negotiations
- IP based business models
- IP licensing for creating sustainable impact
- Standard essential patents and FRAND principles

Managing IP in collaborative innovation processes

- Managing IP in open, collaborative and distributed innovation processes
- Contracts and ownership considerations in collaborative R&D projects

IP risk management

- Types of IP associated risks, e.g. reputational, operational and strategic
- IP risk assessment process
- Mitigation strategies to minimize IP associated risks

Developing effective IP strategies

- How IP strategies help maximizing value creation and capture
- IP strategy typologies
- IP strategies for accelerating technology diffusion (e.g. patent pledges)
- IP acquisition and exploitation/ commercialization strategies for inbound and outbound open innovation
- Tools and toolkits for developing IP strategies

Organisational and operational aspects of IP management

- Challenges for organizations' IP cultures when firms move towards more effective, value driven IP management
- Organizational principles and processes for effective IP management (e.g. incentive systems, invention disclosure)
- IP challenges in mergers and acquisitions (e.g. due diligence, disassembly problems)

Further notes

Additional readings and resources for this module will be made available on the module's Moodle page. Assessment details will be given at the start of the module.

Coursework

Coursework assignment 100%.

Student will have to apply the knowledge gained in this module by developing an IP strategy for a selected case company. An IP analysis of the company's own portfolio, those of relevant current and future competitors is an important element of the coursework. Students are expected to use relevant frameworks and tools that are introduced during the module for the coursework assignment.

Coursework	Format	Due date & marks
To develop an IP strategy for a selected case company, which includes an identification of relevant ecosystem actors, an analysis of the company's and competitors' IP portfolios, and the development of an IP strategy for the case company drawing upon the knowledge and tools/ approaches gained during the module. Further details will be available on the module's Moodle page.	Individual report, anonymously marked	Towards the module (spec details will be beginning of

Booklists

The module mostly relies on academic articles, which will be shared with students via the module's

Moodle page.

Examples of books with relevance for this module are:

- Chesbrough, H. W. (2006). Open Innovation: The New Imperative for Creating and Profiting from

Technology, Harvard Business Press.

- Contreras, J. (2022). Intellectual Property Licensing and Transactions: Theory and Practice.

Cambridge: Cambridge University Press.

- Granstrand, O. (1999). The Economics and Management of Intellectual Property: Towards

Intellectual Capitalism. Cheltenham, UK and Northampton, MA, USA, Edward Elgar Publishing.

- Phelps, M. and D. Kline (2009). Burning the Ships: Intellectual Property and the Transformation of

Microsoft, Wiley Hoboken.

- O’Connell, D. (2011). Harvesting External Innovation, Gower Publishing.

- O’Connell, D. (2021). Intellectual Property Risk Management. Independently published.

- Rognstad, O. and Ørstavik I. (2021) Intellectual Property and Sustainable Markets. Cheltenham, UK: Edward Elgar Publishing.

- Teece, D. J. (2000). Managing Intellectual Capital: Organizational, Strategic, and Policy

Dimensions, OUP Oxford.

Examination Guidelines

Please refer to Form & conduct of the examinations [2].

Last modified: 04/06/2025 13:28

Links
[1] mailto:ft263@cam.ac.uk
[2] https://teaching26-27.eng.cam.ac.uk/content/form-conduct-examinations