Engineering Tripos Part IIB, 4E4: Management of Technology, 2024-25

Module Leader

Dr L Mortara [1]

Lecturers

Dr L Mortara, Dr R Phaal, Dr C. Kerr, Dr F Tietze, Prof T Minshall

Timing and Structure

Michaelmas term. Eight 2-hour sessions incorporating industry speakers. Assessment: 100% exam

Aims

The aims of the course are to:

- provide students with an understanding of the ways in which technology is brought to market by focusing on key technology management topics from the standpoint of an established business as well as new entrepreneurial ventures
- place emphasis on frameworks and methods that are both theoretically sound and practically useful.
- provide students with both an understanding of the challenges and the practical means of dealing with them in an engineering context.

Objectives

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

- have a thorough appreciation of how technology is used to address market opportunities, and how technology management supports that process
- assess and utilise appropriate technology management methods in different contexts
- understand the core challenges of technology management and the practical means of dealing with them in an engineering context

Content

Introduction: Technology in the business context

- The objectives, content and procedure of the course

- Technology in organisations and markets

- How technology is managed to generate value – the link between technology and innovation

- What are technology management processes and how are they used?

Strategic Technology Management: How do companies plan for future technology progression?

- Strategic technology management

- Planning for the future by linking technology, product and market considerations - Technology Roadmapping (TRM)

- Scenario planning tools to help manage the uncertainties of the future

Identification: How do companies keep up with scientific and technological developments?

- Technology intelligence and its role for organisations

- Technology intelligence systems

- How do the technology intelligence systems operate: the process

Selection: How to select the right technology for the future?

- Selecting technology investments: specific problems

- Tools and techniques for technology selection

- How do companies manage a portfolio of R&D projects?

Protection: Protecting technology to ensure future business opportunities

- The relevance of intellectual property (IP) in today's technology and business context.

- How to manage and enforce IP strategically for technology related business problems.

- How to organize for effective IP management.

Acquisition: Different routes to acquire technology from partners

- The process of technology acquisition

- Defining the motivation and what we want to acquire (e.g. Make or buy?

- Assessing the match (Internal drivers, technology and partners' characteristics)

- Deciding the setup of the acquisition

Exploitation: Making money from new technologies: How to choose the right business model

- What are the different ways in which an idea can be brought to market?

- Why do most innovations reach the market through new firms rather than established firms?

- How do new and established firms work together?

Technology managers: lessons from the trenches

· Invited speaker(s) will reflect on their experience in technology management: Topics covered include

· Managing technology in organisations

· Managing technology projects

· The job of the technology manager

· People in organisations

Resources

Additional resources for this module will be available from Moodle. Details will be given at the start of the module.

Further notes

The order of lectures and lecturers might change at short notice. Please refer to the Moodle page for the latest update

Booklists

Please see the Booklist for Group E Courses [2] for references for this module.

Examination Guidelines

Please refer to Form & conduct of the examinations [3].

UK-SPEC

This syllabus contributes to the following areas of the UK-SPEC [4] standard:

Toggle display of UK-SPEC areas.

GT1

Develop transferable skills that will be of value in a wide range of situations. These are exemplified by the Qualifications and Curriculum Authority Higher Level Key Skills and include problem solving, communication, and working with others, as well as the effective use of general IT facilities and information retrieval skills. They also include planning self-learning and improving performance, as the foundation for lifelong learning/CPD.

IA1

Apply appropriate quantitative science and engineering tools to the analysis of problems.

IA2

Demonstrate creative and innovative ability in the synthesis of solutions and in formulating designs.

KU1

Demonstrate knowledge and understanding of essential facts, concepts, theories and principles of their engineering discipline, and its underpinning science and mathematics.

KU2

Have an appreciation of the wider multidisciplinary engineering context and its underlying principles.

S1

The ability to make general evaluations of commercial risks through some understanding of the basis of such risks.

S2

Extensive knowledge and understanding of management and business practices, and their limitations, and how these may be applied appropriately to strategic and tactical issues.

P3

Understanding of contexts in which engineering knowledge can be applied (e.g. operations and management, technology, development, etc).

P5

Awareness of nature of intellectual property and contractual issues.

US4

An awareness of developing technologies related to own specialisation.

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[1] mailto:lm367@cam.ac.uk
[2] https://www.vle.cam.ac.uk/mod/book/view.php?id=364101&chapterid=54001
[3] https://teaching24-25.eng.cam.ac.uk/content/form-conduct-examinations
[4] https://teaching24-25.eng.cam.ac.uk/content/uk-spec