Engineering Tripos Part IIB, 4E12: Project Management, 2021-22

Module Leader

Dr N Oraiopoulos

Lecturer

Dr N Oraiopoulos

Timing and Structure

Lent term. Eight 2-hour sessions + coursework. Assessment: 100% coursework (please see details below)

Aims

The aims of the course are to:

- introduce the principal elements of project management; equipping students with the basic skills to enable them to manage a project and to operate effectively as part of a project team.

Objectives

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

- use a set of tools and frameworks that enable effective project planning and execution.
- understand the need for appropriate governance structures and control systems in the delivery of project objectives.
- run a small scale project and to be an effective member of any project team.

Content

Session 1: Introduction to Project Management

- Wide applicability of Project Management (PM)
- Reasons why project fail
- History of PM: Roots of change
- Critical Path Method (CPM): Dragonfly Case - part 1

Session 2: Project Planning and Control

- Beyond the CPM; the PERT method
- EVA/ABC
- Design Structure Matrix
- Monte Carlo Simulation and Limitations
- Dragonfly Case - part II

Session 3: Ambiguity in Large Innovative Projects
Flying Car Case
Managing Residual Uncertainty
Strategies for Managing Ambiguity

Session 4: Project Risk Management

- Intro to PM Risk Management
- Review of decision trees
- Real Options

Session 5: Managing Project Teams

- In-class exercise
- Heavyweight vs lightweight project managers
- Functional vs. project-based organizations

Session 7: Portfolio Management

- Scoring tables and financial indices: value and limitations
- Risk return matrices and visual tools
- The need for diversification in high risk projects

Session 8: Project Management Contracts

- Fixed fee/Time and Materials/Performance-based contracts
- Comparison and applicability of each contract type
- Risk-sharing through optimal contract design
- Bargaining power and negotiations

Coursework

In-class individual case discussion contributions (20%), Individual Coursework (80%).

<table>
<thead>
<tr>
<th>Coursework activity: Project Prioritization and Analysis / Final</th>
<th>Format</th>
<th>Due date &amp; marks</th>
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<tbody>
<tr>
<td>[.coursework activity: Project Prioritization and Analysis / Final]</td>
<td>Individual Report anonymously marked</td>
<td>Beginning of Easter Term</td>
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Brief description

You will be given a case study and asked to analyse the risk profiles of different projects portfolios. You will have to make a recommendation regarding what projects should the company select and defend your recommendation with both quantitative and qualitative arguments.

Learning objectives:

- Understand the complexity of project portfolio selection processes
- Analyze the organizational dynamics that affect project execution in project teams
- Analyze how collaborative agreements and contracts can affect project performance

Booklists

Please refer to the Booklist for Part IIB Courses for references to this module, this can be found on the associated
Moodle course.

**Examination Guidelines**

Please refer to [Form & conduct of the examinations](http://teaching.eng.cam.ac.uk/content/form-conduct-examinations) [2].

**UK-SPEC**

The [UK Standard for Professional Engineering Competence (UK-SPEC)](http://www.engc.org.uk/ukspec.aspx) [3] describes the requirements that have to be met in order to become a Chartered Engineer, and gives examples of ways of doing this.

UK-SPEC is published by the Engineering Council on behalf of the UK engineering profession. The standard has been developed, and is regularly updated, by panels representing professional engineering institutions, employers and engineering educators. Of particular relevance here is the [Accreditation of Higher Education Programmes (AHEP)](http://www.engc.org.uk/standards-guidance/standards/accreditation-of-higher-education-programmes-ahep/) document [4] which sets out the standard for degree accreditation.

The [Output Standards Matrices](http://teaching.eng.cam.ac.uk/content/output-standards-matrices) [5] indicate where each of the Output Criteria as specified in the AHEP 3rd edition document is addressed within the Engineering and Manufacturing Engineering Triposes.

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**Links***

[1] mailto:no245@cam.ac.uk  
[2] [http://teaching.eng.cam.ac.uk/content/form-conduct-examinations](http://teaching.eng.cam.ac.uk/content/form-conduct-examinations)  
[5] [http://teaching.eng.cam.ac.uk/content/output-standards-matrices](http://teaching.eng.cam.ac.uk/content/output-standards-matrices)