

**CE 305 ENGINEERING ECONOMICS AND MANAGEMENT  
(Half-module)**

**Co-ordinator:** Professor S. Glaister, (Room 611), Email: [s.glaister@imperial.ac.uk](mailto:s.glaister@imperial.ac.uk)

**Status:** Core Module

**Lecturers:** Professor S. Glaister (SG)  
Ms A. Ahearn (Room 321)

**Structure:** 25 hours [21 lectures and 4 Case Study Presentation sessions]

**Links:** See below

### **Introduction**

The module develops concepts raised in the Engineering in Context courses and provides students with some technical detail of economics and management for engineers. As engineers take responsibility for the biggest projects possible, it is essential that student engineers grasp some key concepts and, hence this module is compulsory.

### **Aims**

As Engineering Economics and Management covers a wide array of subjects, this module has a variety of specific components which, together, allow students to develop a balanced view of the material.

The specific aims are: to provide undergraduate civil engineers with the economics and management skills to enable them to assess investment and project management decisions. To demonstrate the sources of costs and explain how these affect price decisions, to identify sources of risk and discuss ways to manage risk, to understand private and public sources of finance for investment projects and the distinctions between criteria for private investment and public investment, and to introduce students to construction management practice, legal concepts and the various forms of engineering contract. Case studies will be used to aid the understanding of the issues discussed in lectures and help students to apply their learning.

### **Links with other course modules**

The module continues the progression from CE108, Engineering in Context 1 and CE211, Engineering in Context 2. The concepts are also material to CE315, Group Design Project and, in some cases, to the Major Project in the fourth year.

### **SYLLABUS**

- Costing and pricing. Budgets. Break-even. Costing factors of production. Estimating, tendering and pricing.
- Investment decisions. Project investment analysis. Discounted cash flow. Life cycle costing
- Economic and accounting profit. Balance sheets. Cost benefit analysis. Risk.
- Appraisal of public investment projects. Economic regulation of public utilities.
- Principles and practice of project management; work breakdown structures, critical path networks.
- PERT, resource charts, cost charts, S-curves, performance ratios.

- Construction law: voluntary and involuntary obligations
- Construction management and forms of engineering contract

Week	Lecturer	9.00 - 9.50	10.00 – 10.50
15	SG	Introduction. Costing and pricing. Budgets. Break-even. Costing factors of production. Estimating, tendering and pricing	
16	SG	Investment decisions. Project investment analysis. Discounted cash flow. Life cycle costing	
17	SG	Investment decisions. Project investment analysis. Discounted cash flow. Life cycle costing	
17 18	SG	Economic and accounting profit. Balance sheets. Cost benefit analysis.	
19	RH & SG	Introduction to Case study	Risk.
20	SG	Appraisal of public investment projects. Economic regulation of public utilities.	
21	SG	Principles and practice of project management; work breakdown structures, critical path networks. Course work set.	
22	SG	Project management (cont'd): PERT, resource charts, cost charts, S-curves, performance ratios. Course work submit.	
23	ALA	Construction law: voluntary and involuntary obligations	
		Presentations on Friday 14.00 – 6.00	
24	ALA	Construction management and forms of engineering contract	
		Presentations on Friday 14.00 – 16.00	

Case study presentations (4 hours). Written reports by beginning of week 22.  
Presentations on Fridays 14.00 – 16.00 weeks 23, 24.

TBC To be confirmed  
SG Professor Stephen Glaister  
RH Dr Robin Hirsch  
AA Ms Alison Ahearn

### Coursework

Students are required to do class exercises. Each student is also required to take part in a case study and to make written and oral presentations to the rest of the class.

### Assessment

Class exercises and the written case study presentations are assessed as coursework and there is a written examination at the end of the year.

### Recommended Textbooks/Reading

PAYNE AC, CHELSOM JV & REAVILL RP, *Management for engineers John Wiley and Sons, 1996*, Chaps 13-15 are particularly relevant.

LAYARD, R & GLAISTER, S, *Cost Benefit Analysis, Cambridge University Press, 1994.*

PILCHER, R. *Principles of Construction Management 3<sup>rd</sup> Ed McGraw Hill, 1992*, Chaps 3-5, 7-10 and 12 are of relevance

### Learning Outcomes

At the end of the module a student are expected to:

- Understand how costing affects price levels.
- Demonstrate the effect of money value of time, the costs and benefits of safety and effects on the environment; and their impact on evaluating projects from both private and public perspectives.
- Appreciate the role of public authorities in regulating the activities of the utilities.
- Identify the key factors affecting the success of a project.
- Relate key issues of contracts and tort to uncertainty and risks in construction management.
- Demonstrate independent thought in coming up with solutions to practical management problems.