FACULTY OF ENGINEERING SCIENCE AND THE BUILT ENVIRONMENT

Unit title:	Design of an Engineering	System
Unit number:	BCE/3/121	
Unit value:	1.0	
Unit co-ordinator:	P J Mellow	
Contact time:	Lectures	20 hours
	Site visits	10 hours
	Seminars/Tutorials	25 hours
	Presentations	10 hours
Private study time:	85 hours	
Unit pre-requisites:	BCE/2/110 and BCE/2/114 or equivalent	

SHORT DESCRIPTION

To involve the student with the process of engineering project development from planning to detailed design working with a project team.

AIMS

- To integrate the design function and process in relation to taught units in the core subjects .
- To develop qualitative skills in connection with construction, planning and feasibility studies.
- To develop student's skills in the communication of construction design ideas.
- To engage students in team working interaction through group work projects and thus develop social and interpersonal skills, leadership and commitment.
- To provide a practical context for environmental and safety issues
- To inculcate thinking of the CDM Regulations into student's every design process

LEARNING OUTCOMES

- understand the process of system design by successive reduction
- appreciate the management demands of group co-ordination
- develop research skills in respect of a non-routine problem
- develop presentational skills (verbal, written and graphical)
- produce project reports, calculations and drawings of a standard acceptable in civil engineering practice
- appreciate the commercial, political and social impact of large projects

TRANSFERABLE SKILLS

BECOME MORE AWARE OF THEIR RESPONSIBILTY FOR THEIR OWN LEARNING DEVELOP THE ABILITY TO SYNTHESISE AND TEST SOLUTIONS AGAINST GIVEN CRITERIA BECOME MORE COMFORTABLE WHEN WORKING WITHIN A TEAM, GAIN ABILITY TO PLAN AND TRACK PROGRESS WORK INDEPENDANTLY WITHIN A GROUP TIMESCALE

TEACHING AND LEARNING PATTERN

- * Selected lectures, particularly from external sources with specific expertise in the particular system chosen.
- ** Seminars in groups under close supervision of design engineers
- *** Sessions involving normal supervised sessions or site visits to engineering systems similar to those under design

Additional lectures will include a visit from the Training Officer of the Institution of Civil Engineers, careers guidance and seminars on CV and applications.

INDICATIVE CONTENT

Planning (Phase Ia)

- The project brief
- Work programming
- Management of project teams the behaviour of teams studied through management games.
- Feasibility studies
- Commercial Awareness and scheme viability
- Engineering system appreciation
- Outline planning of an engineering system
- Environmental impact
- Presentation
- Report writing

Outline design (Phase Ib)

- Division of an engineering system into component systems.
- Outline design methods for system components.
- CDM in the initial project design
- Critique

Detailed design (Phase II)

- Understanding the design brief identifying design goals.
- Employing design standards identifying appropriate statutory requirements and codified methods of achieving standards.
- Sub division of component systems into components for design
- Presentation of calculations
- Presentation of drawings
- Risk Analysis
- Tender documentation
- Design critique

ASSESSMENT METHOD

Continuous Assessment

Groups will give 2 verbal presentations each of one half hour duration and accompanied by a written report. Phase Ia - 25% and Phase Ib - 25%; with equal marks being available in both for the presentation and the submitted report.

Phase II - Groups will prepare one design package which will be the subject of a l hour viva conducted after the assessment of the submitted report, drawings and engineering calculations. Marked at 50% - with equal marks available for the verbal defence of the design and the design package submitted.

Groups will keep a formal programme and supporting minutes to record individual

Member's contribution. The standard of the minutes and programmes will be assessed during the normal marking of the reports submitted.

Generally, marks will be awarded to the group. These marks may be redistributed by reference to minutes and programme in collaboration with the Unit Tutor

The best design may be submitted for a national competition and they may award their own prize, all as per the initial brief.

INDICATIVE SOURCES

Background

Seeley, I.H., Public Works Engineering. Macmillan. 1992. ICE Proceedings. Various. ICE. CIRIA. The Environmental Handbook for Building and Civil Engineering. Vol. 1. CIRIA. 1994.

A bespoke reference list is prepared for each different system to suit the design project chosen which may form an entry into a nationally set competition by either the SCI or Concrete Centre.

A typical list is attached as used for a recent theme of the design of a tidal river port.

Bertlin and Partners, Port Structures: An Analysis of Costs and Design Quay Walls, Locks and Transit Sheds, National Port Council, 1969, 112pp.

Davies, C M., Webb, R J, The Development of a Large Terminal. Dock & Harbour Auth (GB), Vol.55, No.645, July 1973, pp.84-87.

Dickson A.F., What the Engineers Should Know About Ship Handling Problems, ICE Journal. Nov. 1971, Vol.50, pp 277-285.

Telford, T., I.C.E. Port engineering and Operation - Proceedings on Conference on British Ports and their Future, 1985, pp.235.

Leimborfer, P. Sheet Piling, Dock & Harbour Auth. (GB), Vol. 58, No.687, Feb.1978, pp. 407-418.

Page, F.A., Cuttis, R.C., Mills, H.G.J., Design and Construction of the Northfleet Hope Container Terminal, Tilbury Dock., Proc. Inst.Civ. Engrs. Part 1, (GB), Vol 70, 1981, pp. 623-650.

Shonfield, P., Sharafeldien, O., Optimal Berth and Crane Combination in Container Ports, J. Waterway, Port, Coast. & Ocean Engrg., ASCE., Vol. 111, No.6, Nov.1985, pp. 1060.

Quinn, A., Design and Construction of Ports and Marine Structures. McGraw-Hill. 1972.