Engineering Tripos Part IIB, 4M14: Sustainable Development, 2017-18

Module Leader
Dr K MacAskill [1]

Coursework leader
Kristen MacAskill [1]

Timing and Structure
Michaelmas term. 8 x 2-hour afternoon sessions. Assessment: 100% coursework

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

- Understand the history behind the concept of sustainable development in international and national policies.
- Recognise common frameworks for sustainable development.
- Appreciate how engineers can influence sustainable development.
- Begin to appreciate the opportunities and challenges for incorporating sustainability objectives into infrastructure planning and design.
- Argue a sustainable development case in an effective manner.

Content

This course broadens the horizons of engineering through exploring the influence of the political, social and environmental context on developing the built environment. The module will involve discussion on the ways in which engineering is employed to serve the needs of societies, considering both current issues and future impacts. Building on the concept that actions and consequences are interconnected in a global system on which we all depend, the material will involve an examination of the ethics of engineering. Students will be encouraged to draw on their own experiences and explore their personal reactions to a number of situations and issues.

This module aims to challenge students to think about the role of engineers beyond their technical expertise. It will give students the opportunity to engage in a range of perspectives. It is hoped that this will help students to address challenges they face in their professional role, where contextual issues must be considered alongside technical considerations in planning and designing infrastructure.

Each teaching session will include a mixture of a lecture format plus group discussions. Students will be expected to participate fully in all aspects related to the subject.

Introduction to sustainable development (2 lectures)
- Sustainable Development definition
- International policy
- Conceptual frameworks

**Sustainability assessment (1 lecture)**
- Emergence of sustainability assessment decision-support tools
- Key tool characteristics

**Disaster risk management (1 Lecture)**
- Links between sustainable development and disaster management
- Understanding risk
- Vulnerability to natural and man-made hazards
- Resilience

**Thinking globally and locally (1 Lecture)**
- Global energy availability and use
- Sustainable energy choices?
- Managing supply and demand
- Traditional and renewable energy - technologies and options
- Climate legacy implications

**Manufacturing/supply chains (1 Lecture)**
- Materials and resource impacts
- Systems analysis

**Practitioner viewpoints (2 Lectures - guests)**
- UK case studies of infrastructure development through a sustainability lens
- International case studies of infrastructure development through a sustainability lens
Coursework

Students are expected to complete two pieces of coursework. The first coursework will involve a short piece of writing that will respond to a topic on the theme of engineering and sustainable development. This will account for 20% of the total marks and will serve as practice for writing a longer assignment. The second coursework will require students to write an essay (maximum 2500 words), which will account for 80% of the total marks. There will be scope for students to choose a topic that interests them.

Students are expected to do additional research and investigation beyond the course content in order to complete the coursework assignments satisfactorily.

Booklists

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

Examination Guidelines

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

UK-SPEC

The UK Standard for Professional Engineering Competence (UK-SPEC) [4] 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) document [5] which sets out the standard for degree accreditation.

The Output Standards Matrices [6] indicate where each of the Output Criteria as specified in the AHEP 3rd edition document is addressed within the Engineering and Manufacturing Engineering Triposes.