Energy Studies	
School	Built Environment
Module Leader	Dr Douglas Harris
	Dr Constantinos Balaras Dr Aris Tsangrassoulis
Module Number	D19SM
Credits	12
Assignments	YES
Exams	YES
Student Effort ours	120
Pre-reading/Other Program-related Activities	12 hours
Formal Lectures/Workshop	26 hours
Discussions/Group Activities/Case Studies/Demonstrations	6 hours
Laboratory work	4 hours
Independent Study & Coursework	72 hours

Objectives

The aim of this module is to give the students an understanding of the implications of energy use for the design and operation of building services. Specifically, to provide an introduction to the aims, principals and techniques of energy management in buildings. The objective is for students to acquire sufficient understanding of the subject to be able to carry out an energy audit of a building, to advise on the measures necessary to reduce energy consumption, and to assess their cost effectiveness.

Subjects

- Introduction to energy management and the energy audit
- Measurement and instrumentation
- Techniques for reducing energy consumption
- Management systems
- Appraisal methods
- Estimating Energy Consumption

Content

Introduction to energy management: energy use in buildings, aims and principles of energy

management, energy audits.

Assessment of energy consumption: measuring and monitoring equipment and techniques, energy consumption calculation methods, building services and energy software.
Techniques for reducing energy consumption: equipment controls, building energy management systems.

The role of the energy manager: evaluating the benefits of energy management, simple and discounted payback periods, rate of return, net present value, energy supply, contract energy management, the future of energy management.

In unit 1 of the module the student is introduced to the subject by brief consideration of the scope of energy management, and is then taken through the energy audit technique. This is followed in unit 2 by a study of the instruments and techniques used to measure energy consumption. Unit 3 is an examination of selected items of plant for reducing energy use, and an investigation of the role of controls in maximising energy efficiency. The functions and capabilities of the BMS system and their role in monitoring and reducing energy use are covered in unit 4. An introduction to methods of appraising the effectiveness of energy-saving investments, including simple pay back periods and discounted cash flow methods is covered in unit 5. Unit 6 introduces a simplified version of the degree-day method for estimating heating consumption.