

OUTER CORE MODULES (students must choose 2 from 4)

Module *ESD 500 Sustainable Design and Implementation*
Leader: Dr Dick Fenner

Timing: Lent term

Structure: Eight 2-hour sessions in Weeks 1 to 8: plus coursework assignments.

Synopsis

The module will review a range of sustainability principles and design strategies which can guide the formulation of better product design on a full life cycle basis. It will also focus on how such products are managed through the supply chain, to customers and then final disposal (or reuse). The opportunity for synergies between industrial sectors will be explored.

The module will also examine the implementation of projects designed to deliver a range of services in a more effective and sustainable manner, and through the use of cases drawn from specific sectors (such as water, energy and transport) examine where key vulnerabilities and opportunities may lie, and explore principles of adaptive management and resilience.

A holistic overview of these approaches to both product and project delivery will be discussed in the context of city dwelling and how urban spaces can be designed in the future to achieve social harmony, economic stability and environmental protection through integrated policies and governance structures.

Content

Principles of **Sustainable Design** (e.g. 5 capitals model, Natural Step etc) and practical applications in interdisciplinary design of sustainable cities and industrial supply chain management. Integrating disciplines in a sustainable design team.

Life cycle product design, dematerialisation, clean production, ecological clustering of industry, nature as a teacher, ecological principles in design biomimicry, Procurement, re-use, re-make, recycle, efficient distribution, reliability/durability/maintainability, end of life disposal and re-use. Green engineering.

Theory of **transition management**, and principles of adaptive management and resilience in energy, water and transport sectors; innovation networks. Optimisation vs resilience. Energy management and building design for energy efficiency. Green streets and transportation networks.

Sustainability reporting and corporate social responsibility

Achieving **sustainable urban form**; Cities of the Future

Objectives

- To examine how a variety of sustainable design principles can be adopted in products and services
- To highlight examples of best practice in implementing sustainable solutions in a range of engineering sectors
- To propose a sustainable solution to an industrial /e engineering problem
- To examine the barriers and drivers for adopting sustainability in companies and the methods of CSR and sustainability reporting

Assessment 100% coursework