



14195150

Sustainability and the Environment

Course Code	14195150	Course Name	Sustainability and the Environment
Course Type	Engineering	Prerequisite	N/A
Instructor	TBA	Other Teachers	TBA
Total Hours	48 Teaching Hours		+ Self Study Hours

Learning Objective

By the end of this course you should be able to:

- Develop ecological literacy and have the capacity to understand the different life cycles and systems in design
- Form an interconnected understanding of the relationship between humans and nature as well as the built environment
- Understand the relationship between natural and human-constructed support systems and how they embody symbiosis and resilience.
- Work effectively in a diverse team whilst applying multidisciplinary knowledge to manage, lead and resolve any disputes.
- Apply project management capabilities which allow for efficient planning, integration and management of projects
- Establish an understanding of how engineering is based in a social, economic and environmental context simultaneously.
- Systematically evaluate the various alternative design solutions by looking at their efficiency and environmental consequences.



Course Description

The course assists students enrolled in engineering and built environment degrees to focus on evaluating their designs and experimenting with ideas to find practical, innovative solutions to related issues. Through analysing sustainable designs, students are able to find solutions which support regional and economic development. Some key aspects which need to be considered in designs include water systems, waste management and energy distribution. This course requires students to work collaboratively in teams where they are expected to share skills, knowledge and relevant insight to create sustainable design solutions aimed at resolving real-life problems. Towards the end of the course, students are expected to complete a 'sustainable innovation challenge' which integrates the specialized skills of each student in the team. Students will need to contribute insights to the team through a combination of their skills, knowledge and effective communication both from within the course and from their respective disciplinary fields.

Summary of Course delivery

This course has a total of 48 teaching hours and includes a compulsory field trip.

The table below summarises the delivery method for this course.

Lectures	Guest Speakers	Seminars	Group Activities	Field Trip(s)
√	√		√	√
Tutorials	Projects	Pitch(es)	Presentations	Others
√			√	

Course Schedule (TBC)

Topics	Activities
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Introduction of the course and project briefing	Lecture; Tutorial
Environment and society	Lecture; Tutorial
Sustainability frameworks, including industrial metabolism and ecology, dematerialisation and the precautionary principle	Lecture; Tutorial
The Whole System Approach to Sustainable Design	Lecture; Tutorial
Design for the Environment: Process Synthesis and Analysis Tools	Lecture; Tutorial
Energy resources, conversion, use and consequences	Lecture; Tutorial
Energy supply, demand and Distribution generation and Review of existing power sources	Lecture; Tutorial
Energy use in buildings, embodied energy & LCA	Lecture; Tutorial
Water resources, use, consequences and control	Lecture; Tutorial
Sustainable design for water provision, distribution and use	Lecture; Tutorial
Waste management– principles including heat and mass flows	Lecture; Tutorial; Quiz
Sustainable design, engineering and management in industry	Lecture; Tutorial
Economics of Sustainable Systems	Lecture; Tutorial



Sustainable buildings and environment	Lecture; Tutorial
Health, Risk and Safety	Lecture; Tutorial; Group project Presentation
Ethics & Justice	Lecture; Tutorial; Group Report submission

Assessments

Class participation	10%
Quiz	20%
Group project presentation	10%
Group project report	20%
Final exam	40%

Tutorial participation (10%)

Active engagement in class activities and discussions are encouraged to consolidate what has been learnt in lectures.

Quiz (20%)

To be completed during lectures at the set time. Multiple choices and short answers will be required for students to show that they have fully understood what has been taught during lectures.

Group project (20%) and class presentation (10%)

Details of the sustainable design project will be announced and discussed in class. Students will be allocated into groups to complete a group project relating to course



topics. They are required to work collaboratively with each other to complete this task and present it to the class through a speech.

A sustainable design project is to be developed, with:

- 8 pages maximum in A4,
- 12 point Times New Roman font
- Single line spacing□
- Late submission will attract a penalty of 10% of the total weighting of the assessment task. A 10% deduction applies for EACH late day and the assessment will not be accepted after 5 working days. Extensions will only be granted upon the basis that there is reasonable medical evidence of illness or any other extreme circumstances. Under no circumstances will extensions be granted for work or any other commitments. A request for an extension must formally submitted to the lecturer in writing prior to the due date, in accordance with the assessment policies. Medical certificates or other evidence of extreme misfortune must be submitted through a special consideration form and must contain information that justifies the extension sought.

Final examination (individual) 40%

A 2 hour final exam will be conducted during the set examination period.

Reference Books

Hawken, P., A. B. Lovins & L.H. Lovins, *Natural capitalism: creating the next industrial revolution*. Little, Brown and Co. Boston., 1999.

Vallero, D and Brasier, C, *Sustainable design : the science of sustainability and green engineering*. Hoboken, N.J., John Wiley, 2008.

Stasinopoulos, P., Smith, M., Hargroves, K. and Desha, C., *Whole System Design – An Integrated Approach to Sustainable Engineering*. Earthscan, London, and The Natural Edge Project, Australia. on line at:

http://www.naturaledgeproject.net/Whole_System_Design.aspx, 2008.