# ES4A8-15 Design for Sustainability

## 26/27

**Department**
School of Engineering
**Level**
Undergraduate Level 4
**Module leader**
Simoni Da Ros
**Credit value**
15
**Module duration**
10 weeks
**Assessment**
100% coursework
**Study location**
University of Warwick main campus, Coventry

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## Description

## Introductory description

ES4A8-15 Design for Sustainability

Module web page

## Module aims

Ecological and ‘green’ constraints weigh significantly on engineering designers already and these pressures are likely to increase very significantly during the careers of today’s students. This module examines the need for significant change in the design philosophy employed in industrialised manufacture and civil construction in terms of energy and resource use. It then examines responses to those pressures including legislation and standards, alternative processes and materials and design for resource economy at small and large scale.

## Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

Introduction - understanding definitions of sustainability, what are the key problems, different roles

and perspectives of stakeholders
Energy - role of energy generation in industry, transportation and domestic use cases
Materials - sustainability in use of metals, polymers and composite materials
Design - how bad design prevents usage, design in construction, disassembly, repair, recycling
End of life - recycling and the circular economy, looking at metals, polymers, glass and paper
Assessment - life cycle assessment and life cycle costing

## Learning outcomes

By the end of the module, students should be able to:

- Demonstrate advanced understanding of the significance and importance of material resource and energy limitations to professional design engineers. (M5, M7)
- Systematically apply lower energy and resource demanding materials and technologies for small scale products and large scale projects. (M5, M6, M7)
- Critically assess the significance of environmental law and other standards for large and small businesses. (M7, M15)
- Evaluate the environmental impact of engineering decisions on factors such as global warming (M1, M7, M13, M15)
- Show systematic understanding of the effect of location, orientation and form on environmental economies, adaptability and flexibility of use or reuse. (M7)

## Indicative reading list

Reading lists can be found in Talis

Specific reading list for the module

## Research element

Students are tasked with research on how to improve the sustainability of a product or process of their choice.

## Subject specific skills

Sustainable Engineering
Sustainable Design
Materials & Process Selection

## Transferable skills

Critical thinking: Make informed decisions on the value of a range of sources allowing an evidence-based conclusion based on this analysis.
Problem-solving: Use rational and logical reasoning to deduce appropriate and well-reasoned conclusions
Communication - Verbal: Communicate orally in a clear and sensitive manner which is appropriately varied according to different audiences.

Communication - Written: Present arguments, knowledge and ideas, in a range of formats.
Teamwork: Operate within, and contribute to, a respectful, supportive and cooperative group climate.
Sustainability: Understands the climate emergency and committed to an active contribution to a sustainable world.

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## Study

## Study time

| Type | Required |
|---|---|
| Lectures | 30 sessions of 1 hour (20%) |
| Private study | 120 hours (80%) |
| Total | 150 hours |

## Private study description

120 hours of guided independent learning

## Costs

No further costs have been identified for this module.

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## Assessment

You must pass all assessment components to pass the module.

Students can register for this module without taking any assessment.

### Assessment group A5

| | Weighting | Study time | Eligible for self-certification |
|---|---|---|---|
| **Assessment component** | | | |
| Case Study Group Presentation | 40% | | No |
| Group case study presentation, including peer assessment | | | |
| **Reassessment component** | | | |

| | Weighting | Study time | Eligible for self-certification |
|---|---|---|---|
| Resit for A20 - AssignmentResit for A20 - Assignment<br>Assignment 10 pages maximum | | | No |
| **Assessment component** | | | |
| Individual report<br>12-page individual report | 60% | | Yes (extension) |
| **Reassessment component is the same** | | | |

### Feedback on assessment

Written individual feedback on essay submissions and cohort level feedback on the oral presentation.

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## Availability

## Courses

This module is Core optional for:

- Year 4 of UESA-H219 MEng Civil Engineering with Exchange Year

This module is Optional for:

- Year 4 of UESA-H116 MEng Engineering with Exchange Year
- Year 5 of UESA-H115 MEng Engineering with Intercalated Year
- Year 1 of TESA-H341 Postgraduate Taught Advanced Mechanical Engineering

This module is Core option list A for:

- Year 4 of UESA-H336 MEng Automotive Engineering
- Year 5 of UESA-H337 MEng Automotive Engineering with Intercalated Year
- Year 4 of UESA-H217 MEng Civil Engineering
- Year 5 of UESA-H218 MEng Civil Engineering with Intercalated Year
- Year 4 of UESA-H114 MEng Engineering
- Year 4 of UESA-HH76 MEng Manufacturing and Mechanical Engineering
- Year 5 of UESA-HH77 MEng Manufacturing and Mechanical Engineering with Intercalated Year

- Year 4 of UESA-H311 MEng Mechanical Engineering
- Year 5 of UESA-H317 MEng Mechanical Engineering with Intercalated Year

This module is Core option list B for:

- Year 4 of UESA-H336 MEng Automotive Engineering
- Year 5 of UESA-H337 MEng Automotive Engineering with Intercalated Year
- Year 4 of UESA-H311 MEng Mechanical Engineering

This module is Core option list C for:

- UESA-H311 MEng Mechanical Engineering
    - Year 4 of H311 Mechanical Engineering
    - Year 4 of H30L Mechanical Engineering with Automotive Engineering
    - Year 4 of H30M Mechanical Engineering with Robotics
    - Year 4 of H30N Mechanical Engineering with Systems Engineering
- Year 4 of UESA-H316 MEng Mechanical Engineering
- Year 4 of UESA-H318 MEng Mechanical Engineering with Exchange Year