

ES4A8-15 Design for Sustainability

27/28

Department

School of Engineering

Level

Undergraduate Level 4

Module leader

Stuart Coles

Credit value

15

Module duration

10 weeks

Assessment

100% coursework

Study location

University of Warwick main campus, Coventry

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](#)

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.

Study

Study time

Type	Required
Lectures	30 sessions of 1 hour (20%)
Other activity	2 hours (1%)
Private study	118 hours (79%)
Total	150 hours

Private study description

118 hours of guided independent learning

Other activity description

Guided revision sessions at the start of Term 3, used to catch up/refresh material taught in Term 1.

Costs

No further costs have been identified for this module.

Assessment

You must pass all assessment components to pass the module.

Students can register for this module without taking any assessment.

Assessment group A1

	Weighting	Study time	Eligible for self-certification
Assessment component			
Case Study Group Presentation	40%		No

Weighting Study time Eligible for self-certification

Group case study presentation, including peer assessment

Reassessment component

Assignment No

Assignment 10 pages maximum

Assessment component

Individual report 60% Yes (extension)

12-page individual report

Reassessment component is the same

Feedback on assessment

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

Availability

Courses

This module is Core for:

- Year 4 of UESA-H163 MEng Biomedical Systems Engineering
- Year 5 of UESA-H164 MEng Biomedical Systems Engineering with Intercalated Year
- UESA-H211 MEng Civil Engineering
 - Year 4 of H211 Civil Engineering
 - Year 4 of H20A Civil Engineering with Business Management
 - Year 4 of H20C Civil Engineering with Fluid Dynamics
 - Year 4 of H20B Civil Engineering with Sustainability
- UESA-H212 MEng Civil Engineering with Intercalated Year
 - Year 5 of H212 Civil Engineering with Intercalated Year
 - Year 5 of H20N Civil Engineering with Intercalated Year with Appropriate Technology
 - Year 5 of H20G Civil Engineering with Intercalated Year with Business Management
 - Year 5 of H20J Civil Engineering with Intercalated Year with Fluid Dynamics
 - Year 5 of H20H Civil Engineering with Intercalated Year with Sustainability
- Year 4 of UESA-H114 MEng Engineering

- Year 5 of UESA-H115 MEng Engineering with Intercalated Year
- Year 5 of UESA-HH78 MEng Manufacturing and Mechanical Engineering with Exchange Year
- Year 4 of UESA-HH77 MEng Manufacturing and Mechanical Engineering with Intercalated Year
- UESA-HH31 MEng Systems Engineering
 - Year 4 of HH31 Systems Engineering
 - Year 4 of HH35 Systems Engineering
- Year 5 of UESA-HH32 MEng Systems Engineering with Intercalated Year

This module is Optional for:

- Year 4 of UESA-H336 MEng Automotive Engineering
- Year 5 of UESA-H337 MEng Automotive Engineering with Intercalated Year
- UESA-H316 MEng Mechanical Engineering
 - Year 4 of H315 Mechanical Engineering BEng
 - Year 4 of H316 Mechanical Engineering MEng
- Year 5 of UESA-H317 MEng Mechanical Engineering with Intercalated Year
- Year 1 of TESA-H341 Postgraduate Taught Advanced Mechanical Engineering