



Module Specification

Energy Technologies

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Part 1: Information

Module title: Energy Technologies

Module code: USSKCC-15-3

Level: Level 6

For implementation from: 2023-24

UWE credit rating: 15

ECTS credit rating: 7.5

Faculty: Faculty of Health & Applied Sciences

Department: HAS Dept of Applied Sciences

Partner institutions: None

Field: Applied Sciences

Module type: Module

Pre-requisites: The Earth 2023-24

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: Not applicable

Features: Not applicable

Educational aims: See Learning Outcomes

Outline syllabus: The module will include an overview of fossil fuels, nuclear energy, renewable energy and renewable fuel sources; the principles of energy transformations and thermodynamics.

UK fuel and energy production and use will be analysed together with an assessment of the UK's fuel/energy security.

Fossil fuels will include: oil, gas and coal; the potential application of fracking for oil and gas production will be considered.

Nuclear energy will include both fission and fusion sources.

Renewable energy sources will include: tidal power, wave energy, geothermal, solar (solar-thermal and photovoltaic), wind generation, biomass for combined heat and power, biogas, biofuels and 'blue skies' power systems. The latter will include the 'hydrogen economy' and sub-space systems.

The module will include calculation of energy budgets from individual energy sources and their potential contribution to carbon saving together with life cycle analysis of such systems.

Energy storage systems, power supply and transmission, and conversion losses will be considered.

Socioeconomic analysis of differing energy and fuel systems will be undertaken.

Part 3: Teaching and learning methods

Teaching and learning methods: The delivery of the module will include lectures, practical classes and workshops with the following contact hours (total 36 hours):

Lectures: 18 hours

Practical classes: 12 hours

Workshops: 6 hours

A variety of teaching and learning methods will be adopted in the presentation of this module.

Lectures will describe the underpinning principles of energy and fuel systems, thermodynamics and energy technologies (both non renewable and renewable).

Practical classes will provide 'hands-on' experience in the production and analysis of biofuels, and practical assessment of the efficiency of different energy transformation systems.

Workshops will be undertaken in various forms and will include: demonstration of a variety of energy generation and utilization systems, energy utilization efficiency measurement, energy data acquisition and appraisal, and analysis of historical and current UK energy data.

Scheduled learning (36 hours) includes lectures, practical classes and workshops.

Independent learning (114 hours) includes hours engaged with essential reading, case study preparation, assignment preparation and completion. These sessions constitute an average time as indicated below:

Essential reading (28 hours i.e. 25%)

Case study research and completion (58 hours i.e. 50%)

Final revision and preparation for examinations (28 hours i.e. 25%)

Module Learning outcomes: On successful completion of this module students will achieve the following learning outcomes.

MO1 Understand energy transformations and the thermodynamic factors that influence, and constrain such transformation

MO2 Describe a range of energy technologies

MO3 Critically compare renewable and non-renewable energy and fuel sources

MO4 Critically assess various energy technologies with respect to climate mitigation and life cycle analysis

MO5 Critically determine appropriate energy and fuel generation strategies for UK, European and worldwide situations

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 114 hours

Face-to-face learning = 36 hours

Total = 150

Reading list: The reading list for this module can be accessed at [readinglists.uwe.ac.uk](https://uwe.rl.talis.com/modules/usskcc-15-3.html) via the following link <https://uwe.rl.talis.com/modules/usskcc-15-3.html>

Part 4: Assessment

Assessment strategy: The basic assessment strategy with respect to learning outcomes is presented in the Learning Outcomes section of this document.

The assessment strategy includes an examination (unseen; 3 hours) and one written assignment (2500 words) based around a case study.

The three hour examination is designed to test the student's understanding of the underpinning principles of energy generation and transformation, including thermodynamics, as well as the student's knowledge of energy utilisation processes. The examination will also assess the student's ability to appraise, critically, energy and fuel generation scenarios and to relate these to technical, economic and social factors.

The case study based written assignment is designed to assess the student's ability to: acquire energy utilisation data and socioeconomic data; critically appraise and analyse such data; formulate future scenarios for energy and fuel usage and generation. The coursework assignment is also designed to assess the student's ability to present such information as a written report.

Assessment Task 1 (the three hour examination) represents 60% of the module mark and Assessment Task 2 (the 2500 word case study based report) represents

40% of the module mark. Thus the allocation of marks is as follows:

Examination (3 hours): 60%

Coursework (2500 words): 40%

There is no specific formative feedback; workshops may include group analysis and non-summative presentations in which case feedback can be given. Summative feedback will be provided via the written coursework assignment.

Assessment tasks:

Examination (First Sit)

Description: Examination (3 hours)

Weighting: 60 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3

Case Study (First Sit)

Description: Case study (2500 words)

Weighting: 40 %

Final assessment: No

Group work: No

Learning outcomes tested: MO2, MO3, MO4, MO5

Examination (Resit)

Description: Examination (3 hours)

Weighting: 60 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3

Case Study (Resit)

Description: Case study (2500 words)

Weighting: 40 %

Final assessment: No

Group work: No

Learning outcomes tested: MO2, MO3, MO4, MO5

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Environmental Science [Sep][FT][Frenchay][3yrs] BSc (Hons) 2021-22

Environmental Science [Sep][FT][Frenchay][4yrs] MSci 2021-22

Environmental Science [Sep][SW][Frenchay][4yrs] BSc (Hons) 2020-21

Environmental Science {Foundation} [Sep][FT][Frenchay][4yrs] BSc (Hons) 2020-21

Environmental Science {Foundation} [Sep][FT][Frenchay][5yrs] MSci 2020-21

Environmental Science [Sep][SW][Frenchay][5yrs] MSci 2020-21

Environmental Science {Foundation} [Sep][SW][Frenchay][5yrs] BSc (Hons) 2019-20

Environmental Science {Foundation} [Sep][SW][Frenchay][6yrs] MSci 2019-20