MODULE SPECIFICATION

Part 1: Information			
Module Title	Energy Technologies		
Module Code	USSKCC-15-3	Level	Level 6
For implementation from	2020-21		
UWE Credit Rating	15	ECTS Credit Rating	7.5
Faculty	Faculty of Health & Applied Sciences	Field	Applied Sciences
Department	HAS Dept of Applied Sciences		
Module type:	Standard		
Pre-requisites	the Earth 2020-21		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description

Educational Aims: See Learning Outcomes

Outline Syllabus: The development of civilization has been closely tied to the development of energy technologies from the discovery of fire in the stone-age, to our current dependency on fossil fuels. However, mankind is facing an uncertain future due to our impacts on the environment, particularly with regard to recent fossil fuel use that is causing the climate to change. Renewable energy technologies may or may not be the final solution to our environmental problems, but they are certainly a transition route from our current unsustainable fossil fuel based economy to a more sustainable and stable future (fusion?) economy.

The module will include an overview of current fossil fuels (oil, gas and coal), nuclear energy (fission and fusion), renewable energy and renewable fuel sources; and the principles of energy transformations and thermodynamics.

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

Renewable energy sources include tidal power, wave energy, geothermal, solar (solar-thermal and photovoltaic), wind generation, biomass for combined heat & power, biogas, biofuels and

'blue skies' power systems. Battery and Fuel Cell Technology.

Computer workshops will involve calculation of energy budgets from individual energy sources and an introduction to Life Cycle Assessment.

Teaching and Learning Methods: The delivery of the module will include lectures, tutorials, virtual visits and computer workshops with the following contact hours (total 33 hours):
Lectures/tutorials: 22 hours
Virtual visit: 3 hours
Workshops: 8 hours

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

Lectures and tutorials will describe the underpinning principles of energy and fuel systems, thermodynamics and energy technologies (both non renewable and renewable). A virtual visit to the Culham Centre for Fusion Energy will introduce the students to world leading research on fusion energy.

Workshops will be undertaken in various forms and will include: demonstration of a variety of energy generation and utilization systems with the island of Unst as a case study example; Life Cycle Assessment with a specific example related to energy use; energy storage systems and calculation of merit order and levelised costs of energy; and a low carbon heating calculator.

Scheduled learning (33 hours) includes lectures, tutorials and workshops.

Independent learning (117 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 (29 hours i.e. 25%)
Case study research and completion (59 hours i.e. 50%)
Final revision and preparation for examinations (29 hours i.e. 25%)

Part 3: Assessment

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

The assessment strategy includes a 24 hour online examination (equivalent to a 3 hour exam) and one written assignment (2500 words) based around a case study.

The online 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 utilization 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 utilization data and socioeconomic data; critically appraise and analyze 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.

Component A (24 hour online examination) represents 60% of the module mark and component B (the 2500 word case study based report) represents 40% of the module mark. Thus the allocation of marks is as follows:
Examination (24 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.

First Sit Components	Final Assessment	Element weighting	Description
Examination (Online) - Component A	✓	60 %	Online Examination (24 hours)
Case Study - Component B		40 %	Case study (2500 words)
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Examination (Online) - Component A	✓	60 %	Online Examination (24 hours)
Case Study - Component B		40 %	Case study (2500 words)

Part 4: Teaching and Learning Methods

Learning Outcomes

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

Module Learning Outcomes	Reference
Understand energy transformations and the thermodynamic factors that influence, and constrain such transformation	MO1
Describe a range of energy technologies	MO2
Critically compare renewable and non-renewable energy and fuel sources	MO3
Critically assess various energy technologies with respect to climate mitigation and life cycle analysis	MO4
Critically determine appropriate energy and fuel generation strategies for UK, European and worldwide situations	MO5

Contact Hours

Independent Study Hours:	
Independent study/self-guided study	117
Total Independent Study Hours:	117
Scheduled Learning and Teaching Hours:	
Face-to-face learning	33
Total Scheduled Learning and Teaching Hours:	33
Hours to be allocated	150
Allocated Hours	150

Reading List

The reading list for this module can be accessed via the following link:

https://uwe.rl.talis.com/modules/usskcc-15-3.html

Part 5: Contributes Towards
This module contributes towards the following programmes of study: Environmental Science [Sep][FT][Frenchay][4yrs] MSci 2018-19 Environmental Science [Sep][FT][Frenchay][3yrs] BSc (Hons) 2018-19