



Module Specification

Energy, Carbon and Climate

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Part 1: Information

Module title: Energy, Carbon and Climate

Module code: USSJQM-15-3

Level: Level 6

For implementation from: 2024-25

UWE credit rating: 15

ECTS credit rating: 7.5

College: College of Health, Science & Society

School: CHSS School of Applied Sciences

Partner institutions: None

Field: Applied Sciences

Module type: Module

Pre-requisites: None

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: This module critically assesses the current state of the Earth's Climate and how Carbon emissions are driving global environmental change. Students will evaluate the future alternatives and opportunities for energy conservation and supply for a transition to a low carbon economy.

Features: Not applicable

Educational aims: This module aims to:

- enable graduates to evaluate the key issues, threats and opportunities linked with international and national approaches for managing the required transition to a low carbon economy.
- enable graduates to use and demonstrate modelling approaches for energy and carbon assessment, budgeting and management.

Outline syllabus: Perspectives, principles and concepts relating to Global Climate, the Energy Gap, Equilibrium Climate Sensitivity and Net Zero.

An overview of fossil fuels and low carbon alternatives including nuclear energy, renewable energy and renewable fuel sources. Life cycle analysis and the principles of energy transitions, transformations and thermodynamics in sustainable systems.

Concepts related to ecological carbon storage from basic carbon calculators to the integration of biogeochemistry into climate models.

The use of modelling in assessing and evaluating carbon budgets, different approaches and emissions pathways for the future transition to a net zero economy.

Part 3: Teaching and learning methods

Teaching and learning methods: The module is delivered as an interactive lecture series and modelling workshops.

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

MO1 Critically analyse perspectives, principles and concepts relating to global climate, the energy gap, equilibrium climate sensitivity and Net Zero.

MO2 Critically evaluate fossil fuels, nuclear energy, and renewable energy sources in terms of resource acquisition, energy transformations, thermodynamics life cycle analysis and ecological carbon storage.

MO3 Demonstrate a critical understanding of modelling in assessing and evaluating carbon budgets, different approaches and emissions pathways for the future transition to a net zero economy.

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://rl.talis.com/3/uwe/lists/900D955B-8CE0-4995-EA1F-F1F39FF7EE43.html?lang=en&login=1) via the following link <https://rl.talis.com/3/uwe/lists/900D955B-8CE0-4995-EA1F-F1F39FF7EE43.html?lang=en&login=1>

Part 4: Assessment

Assessment strategy: Assessment 1: Portfolio

Students will undertake a critical analysis of a UK strategy for future energy demand, meeting the requirements of a net zero carbon budget by 2050 and individually present their strategy (7 minute presentation + 3 minutes questions). The presentation (30%) will build on a presentations given in L5 modules Environment and Field Techniques, and Hydrology to Oceanography.

Students will receive feedback, which feeds forward to the modelling analysis report.

Following the presentation, students will then build a detailed model of one specific aspect of this strategy (e.g. wind energy, solar energy, personal transportation, food production, residential heating etc.) and submit the results of the analysis as a 1800 modelling analysis report (70%). The analysis should demonstrate an in-depth understanding of the applications and limitations of the model, including practicalities relating to real world improvements in resource management e.g. costs, technological viability, legislation, timescales, people and policies.

Students will be supported to succeed in this assessment through assessment support workshops, in which students will work in groups to undertake critical analysis of current environmental and ecological models including guidance on science communication and presentation skills.

Assessment tasks:**Portfolio (First Sit)**

Description: Written report on modelling analysis, following from net zero strategy presentation.

Weighting: 100 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3

Portfolio (Resit)

Description: Written report on modelling analysis, following from net zero strategy presentation.

Weighting: 100 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Environmental Science [Frenchay] MSci 2022-23

Environmental Science [Frenchay] BSc (Hons) 2022-23

Environmental Science {Foundation} [Sep][FT][Frenchay][4yrs] BSc (Hons) 2021-22

Environmental Science {Foundation} [Sep][FT][Frenchay][5yrs] MSci 2021-22

Environmental Science [Sep][SW][Frenchay][4yrs] BSc (Hons) 2021-22

Environmental Science [Sep][SW][Frenchay][5yrs] MSci 2021-22

Environmental Science {Foundation} [Sep][SW][Frenchay][6yrs] MSci 2020-21

Environmental Science {Foundation} [Sep][SW][Frenchay][5yrs] BSc (Hons) 2020-21

Integrated Wildlife Conservation {Top-Up} [Frenchay] BSc (Hons) 2024-25