Module Specification

Ecology and Environmental Systems

Version: 2025-26, v2.0, Approved

Contents

Part 1: Information

Module title: Ecology and Environmental Systems

Module code: USSKAA-30-1

Level: Level 4

For implementation from: 2025-26

UWE credit rating: 30

ECTS credit rating: 15

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 explores the interactions between ecological and Earth systems, covering ecosystem dynamics, bio-geochemical cycles, population genetics, and species adaptation. By integrating ecological principles with Earth system science, the module prepares students to address contemporary conservation and sustainability challenges.

Features: Not applicable

Educational aims: Students will develop critical analysis and problem-solving skills by evaluating ecological and environmental information, applying knowledge to real-world challenges. Through multidisciplinary learning, they will gain a scientific understanding of ecological systems, Earth processes, and sustainability issues, preparing them to address conservation and environmental change effectively.

Outline syllabus: The indicative syllabus of the module is as follows:

Ecosystem structure and function – Definition of ecosystem and components, biotic and abiotic. Trophic levels and energy in ecosystems, comparing productivity. The niche concept and competitive exclusion.

Bio-geochemical cycles – cycling of carbon, nitrogen and water etc. Reservoirs and transformations during cycling. The role of these cycles in maintaining ecosystem structure and function.

Demography and principles of population dynamics – Interspecific and intraspecific interactions in ecosystems. Predation, competition and the effects on carrying capacity and breeding strategies.

Population and evolutionary genetics – gene flow in populations and restrictions to flow that cause isolation and speciation. Hardy-Weinberg principle, genetic drift and mutations. Case studies of habitat fragmentation leading to isolated gene pools, for example, Iberian lynx.

Adaptation of species to changes in environmental conditions – Change over time, mass extinction events and the rise of fish, reptiles or mammals. Adaptive radiation in ancient times and more recent periods, for example, dinosaurs and Galapagos finches.

What is Earth system science and how is it studied? – Division of planetary processes into ‘spheres. Importance in understanding development of the planet and changes in modern times, for example, 21st century global warming.

Atmospheric circulation and transfer of energy and water – Movement of air masses and water around the globe. Latent and sensible heat transfer. Effect on major world biomes and weather patterns.

Hydrological circulation and transfer of energy and nutrients – Ocean currents and the movement of nutrients in the oceans, upwelling and downwelling. Effects on major world biomes and weather patterns.

Regional weather patterns – Comparing weather patterns in the UK to other land masses. Synthesising information from the previous two topics and including topography, surface currents and regional albedo.

Biogeography as the link between Earth system science and ecology – Looking at specific biogeographic realms across the globe, how they developed, processes that maintain them and how they may change in the future due to climate change and species loss.

Climate change – Arguments for and against human activities as a cause of global climate change. Current estimates of likely changes and the result for biodiversity. Students participate in a seminar on this topic, having performed research in specific areas.

The impacts of rocks and soils and on biogeographical regions – Soil formation, fertility and water capacity; effects on plants. Rock formation and denudation as a means of shaping habitats, for example, karst topography, Dartmoor, chalk rivers, calcareous grasslands.

Part 3: Teaching and learning methods

Teaching and learning methods: Scheduled learning includes interactive lectures, supervised field visits to sites of ecological or Earth science significance and some laboratory work.

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

MO1 Understand the principles of ecological systems, including how these relate to environmental and conservation issues.

MO2 Understand the basis of evolutionary theory and how species adapt and respond to environmental change.

MO3 Explain the physical concepts underlying the processes of Earth's systems.

MO4 Describe the operation and interaction of the hydrosphere, lithosphere and atmosphere and their relationship with biogeography.

Hours to be allocated: 300

Contact hours:

Independent study/self-guided study = 228 hours

Face-to-face learning = 72 hours

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link https://uwe.rl.talis.com/modules/usskaa-30-1.html

Part 4: Assessment

Assessment strategy: Assessment 1: Poster (15 minutes)
Scientific Poster Presentation
Students will create and present a scientific poster on the impacts of future climate change on a selected biogeographic region. Students are to consult with the lecturer regarding the actual area to be studied and must explain how changes to climate will influence atmospheric and hydrological processes and thus ecology in that region. The assessment includes a 10 minute presentation followed by a 5 minute Q&A session. Marks will be awarded based on poster content, visual quality, and the clarity and depth of the verbal presentation. Support for poster content will be provided through dedicated sessions, and presentation skills will be covered in the accompanying Professional Work Skills module.

Assessment 2: Online exam (24 hours).
This exam evaluates students' knowledge and understanding of key ecological and environmental concepts, covering both theoretical and practical content. It assesses their ability to apply learning across multiple areas, including ecological systems and their role in conservation, evolutionary theory and species adaptation, and the physical processes driving Earth's systems. The exam is designed to reflect the breadth of topics covered in the module, ensuring a comprehensive assessment of core principles. Students will receive support through review sessions and Q&A discussions in the weeks before the exam. Study guides and sample questions will be provided to help them succeed in their exam.

Assessment tasks:

Poster (First Sit)
Description: Poster presentation with questions (10 minute presentation, 5 minute Q&A).
Weighting: 50 %
Final assessment: No
Group work: No
Learning outcomes tested: MO1, MO4

Examination (Online) (First Sit)
Description: Online exam (24 hour submission window)
Weighting: 50 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4

Poster (Resit)
Description: Poster presentation with questions (10 minute presentation, 5 minute Q&A).
Weighting: 50 %
Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO4

Examination (Online) (Resit)

Description: Online exam (24 hour submission window)

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Integrated Wildlife Conservation [Zoo] FdSc 2025-26

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