



# BSc (Hons) Zoology with Environmental Management

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| <b>UCAS code</b>        | Z003  |
| <b>Institution code</b> | H12   |
| <b>Duration</b>         | 4 years (full-time) including a one-year work placement                         |
| <b>Start date</b>       | September 2019  |
| <b>Location</b>         | <a href="#">Harper Adams University campus</a> (and location of work placement) |

## The course

Zoologists are scientists who study the animal kingdom, from the largest mammals to the smallest insects. Understanding the evolution, behaviour and their communities provides an insight into both human and animal life and how they can be sustained in the face of global challenges, from climate change to food security.

Here at Harper Adams, you'll study whole organisms not just species at the molecular level. You'll learn to study animals' physiology, behaviour, and how they interact with other species and their environments, in order to preserve important habitats and manage wildlife in light of climate change.

Zoologists and environmental managers protect endangered species and wildlife from the dangers of habitat loss, disease, invasive species, and climate change, and to safeguard and learn more about human life in the process.

You'll study a wide range of species, from farm livestock to companion animals and exotics, to UK wildlife such as insects, with a strong emphasis on field and laboratory work – both skills in demand by employers.

You'll be taught by conservationists, environmental specialists, entomologists, animal scientists, veterinarians and many more highly experienced staff.

## A-level entry requirements

- Offers tend to be in the region of **104** UCAS points (min 3 x A2 passes)
- An understanding of a biological science based subject, for example Biology, Human Biology, Applied Science or Physical Education would be preferable. We would welcome applications from candidates offering other evidence of their suitability for this programme
- Students should typically be studying **3 subjects at A2 level** to be considered
- When combining qualifications no more than one Subsidiary Diploma will be considered alongside A levels (two A levels for BSc)
- General Studies and Critical Thinking are encouraged but **not** included in grades required
- Applicants are encouraged to gain experience working with a number of different animals in different settings. Applicants should include details of this in their application. Experience of different animals will enable reflection and will help with many aspects as students' progress through the course.
- **4 GCSEs at grade C/4 or above**, including English Language, Maths and a Science
- Applicants can expect to receive offers including specific grades in specific subjects (for example, a B or C at A level, or an M or D for BTEC modules)
- Key Skills (and other level 2 variants) and First Certificates/Diplomas are not accepted in place of

GCSE passes

- Overseas applicants please check our [English Language Requirements](#)
- The majority of candidates will not be called for an interview and a decision will be made via UCAS Track. However, for some students a telephone interview or campus based guidance session will be required. We will simply want to meet you to understand if the course is the right choice for you and to discuss your application in more detail. We will be keen to know your reasons for choosing the course and your career aspirations.

*Note: Entry Requirements are for guidance only, please check the UCAS website or contact Admissions for further information.*

## Work placement

The third year of your degree, which you'll spend on work placement, is your chance to get a year's relevant, high quality experience, in the UK or overseas. You may choose a placement job that builds on your interest in environmental management working for an ecological or environmental consultancy, conservation charity or wildlife trust. The National Trust is a popular placement employer, as are Field Studies centres, local authorities and statutory conservation agencies. Or maybe you'll take the opportunity to work with species you won't find at Harper such as zoo or marine animals. You might work within a zoo, for example, or the Durrell Wildlife Conservation. The choice is yours, but we'll be there with advice and support both before and during your placement.

## Teaching and learning

### What you study

All Zoology students will share a common first year, learning about animal health and behaviour, and conservation. Modules will include survey and field skills, physiology, ecology, and adaptive biology.

You'll start to specialise in your second year, with two of your eight modules focussed on sustainable environmental management. Returning from work placement, you'll specialise further in your fourth year, with more dedicated modules and a focused research project that gives you the chance to explore a topic that interests you or furthers your career ambitions.

### Where you will study

Learning extends beyond the classroom. There will be lots of applied work in our extensive laboratories, on our commercial farm on-campus, forests and pools, in our Companion Animal House, entomology laboratory, the Jean Jackson glasshouse, and entomology resource room with its insect collection. You'll also learn off-site through field trips and work placement.

### Applied field work

You'll take part in at least two residential field courses. In your first year you will head to the Slapton Ley Field Studies Council Centre in Devon where you will learn to conduct independent field research and do a group project. There'll be an opportunity to take part in an overseas course in Spain or Portugal in your second year. In Year 4 you'll design, execute and evaluate a group research project during a further residential course on the island of Anglesey.

## Teaching and learning

Learning at Higher Education level is a big step up from further education so we make sure you get lots of advice and support. Everyone learns differently and in the workplace you'll need to work in different ways, so we make sure our courses test you in every way possible. So you will attend lectures and tutorials, do hands-on work, experience field trips, sit exams, and complete coursework assignments. Topics are based on real world situations.

## Assessment methods

There will be summative assessed course work throughout the programme, and you will receive written feedback on all course work to help you improve. End-of-module assessments will take place in May/June of each academic year. Course work may be reports, presentations or portfolios, produced individually or in a team.

## **Careers**

As a zoologist specialising in environmental management you could become an ecologist, environmental consultant or nature conservation officer. Other careers include research scientists, field trials officers, ecological consultants and nature conservationists. You may find yourself conserving endangered species and habitats, working in disease and pest control, or developing policies and regulations.

Zoologists can also be found improving agricultural crops and livestock, developing and testing new drugs, or promoting animal welfare and education.

# What will I study?

| Year | Study time<br>(The percentage of time spent in different learning activities) |                             |                     | Assessment methods<br>(This is the breakdown of assessment methods) |                 |            |
|------|---|-----------------------------|---------------------|---|-----------------|------------|
|      | % time in lectures, seminars and similar                                      | % time in independent study | % time on placement | Written exams   | Practical exams | Coursework |
| 1    | 32%   | 68%                         | 0%                  | 39%   | 0%              | 61%        |
| 2    | 27%   | 73%                         | 0%                  | 26%   | 0%              | 74%        |
| 3    | 0%  | 0%                          | 100%                | 0%  | 0%              | 100%       |
| 4    | 19%   | 81%                         | 0%                  | 36%   | 56%             | 8%         |

| Year 1   | Year 2  | Year 3         | Year 4   |
|--|---|----------------|--|
| Academic Skills Development (A4001C17) 15                          | Research Methods for Environmental Scientists (C501017) 15  | Placement year | Honours Research Project (HRPROJ) 30                                 |
| Introduction to Ecology (C4004C17) 15                              | Animal Biotechnology and Genetics (A5004C17) 15             |                | Geographical Information Systems and Land Use (C6009C17) 15          |
| Introduction to the Natural Environment (C4006C17) 15              | Animal Ethics (A5014C17) 15                                 |                | Applied Ecology for Management (C6003C17) 15                         |
| Environmental Survey and Field Skills (C4003C17) 15                | Aquatic Ecosystems (C17) 15                                 |                | Environment and Geography Field Course (C6007C17) 15                 |
| Fundamentals of Physiology (A4007C17) 15                           | Principles of Animal Behaviour and Welfare (A5008C17) 15    |                | Environmental Assessment and Management (C6008C17) 15                |
| Adaptive Biology (A4002C17) 15                                     | Pollution, Ecology and Brownfield Reclamation (C5012C17) 15 |                | Applied Companion Animal Health, Welfare and Behaviour (A6007C17) 15 |
| Introduction to Animal Welfare, Behaviour and Ethics (A4009C17) 15 | Wildlife Identification and Conservation (C5011C17) 15      |                | Management of Captive Aquatic Systems (C17) 15                       |
| Principles of Animal Health (A4011C17) 15                          | Environmental Quality and Protection (C5015C17) 15          |                |  |

## Academic Skills Development

**Year of study** 1

**Code** A4001C17

**Credits** 15

**Core/option** Core

**Module contact** [Mrs Emily Chapman-Waterhouse](#)

This module supports the development of students' personal, academic, employability and self-management skills for students in the first year of their undergraduate studies. Whilst the module provides a basis for the rest of the Professional Scholarship Programme it also supports learning in every other module. The module will be delivered throughout the academic year to students on animal-health related undergraduate courses. The main rationale for a first year module of this type is to ensure all students are fully equipped for higher education and to provide space in the curriculum in which to develop relevant skills to aid progression within and out with technically oriented modules. The key themes addressed by this module include transition into higher education and beyond the first year, approaches to learning, independent study, effective communication for animal health-related vocations, reading and reviewing literature, referencing convention, using feedback for learning and using technology to enhance learning. Whilst the roots of the module are in academic skill development, learning resources and assessments will be tailored to the vocational areas relevant to students. Students will need to actively undertake a self- review of progress at regular intervals and develop action plans for self-development.

## Introduction to Ecology

**Year of study** 1  
**Code** C4004C17  
**Credits** 15  
**Core/option** Core  
**Module contact** [Nicky Hunter](#)

Ecology is about understanding the dynamic changes in individuals, populations, communities and ecosystems in relation to each other and the physical environment. This requires knowledge of the essential processes that determine the distribution and abundance of organisms and the variety of complex biotic and abiotic interactions that take place. This module is designed to provide students with a general understanding of the ecology of living systems together with an introduction to basic ecological theory. This module will include a field studies element which will deliver the practical elements of identification, sampling and analysis of data collected.

## Introduction to the Natural Environment

**Year of study** 1  
**Code** C4006C17  
**Credits** 15  
**Core/option** Core  
**Module contact** [Simon Irvin](#)

The countryside and the quality of the rural environment are inextricably linked to studies in the natural environment. This module is designed to investigate the many aspects of the natural environment which impact on the British countryside. This will include the study of rainfall patterns in the UK and causes of climatic change, which has a marked effect on the range of natural habitats in the British countryside. The variety and nature of soils in the UK and how these affect the land quality will be considered. Conservation and the assessment, creation and management of habitats commonly found in, and around agricultural lowland sites and the impact of pollution from agricultural sources will be investigated.

- Outline the hydrological cycle in the UK and the causes and effects of climatic change on the natural environment.
- Identify and assess soil relationships, including soil texture, structure, organic matter and soil processes such as erosion.
- Demonstrate a need for conservation of species and habitat protection.
- Recognise a variety of habitats on lowland farmland and outline how these can be managed to the benefit of the environment.
- State the main sources of agricultural pollution and how these can be controlled.

## Environmental Survey and Field Skills

**Year of study** 1  
**Code** C4003C17  
**Credits** 15  
**Core/option** Core  
**Module contact** [Simon Irvin](#)

This module provides an essential understanding of the main components of applied contemporary field survey / monitoring techniques and procedures. It provides experience in the practical application of these techniques and procedures across a representative range of habitats and environments and vital awareness of risk assessment in field survey work.

The skills and knowledge gained will enable students to undertake survey and monitoring work using a range of practical methods, understand the range of techniques involved and their relative strengths and limitations and to present and interpret data in a coherent and appropriate way.

This module complements the modules at level 4: Introduction to the Natural Environment and Introduction

to Ecology and links to the level 5 module Habitat Ecology and Conservation Management. These modules are core modules for all routes accessing this module and form a fundamental knowledge and practical base for any student entering the environmental and wildlife sector. The module content will also provide material which directly relevant to placement work undertaken by the majority of the students.

## Fundamentals of Physiology

**Year of study** 1  
**Code** A4007C17  
**Credits** 15  
**Core/option** Core  
**Module contact** [Jim Huntington](#)

This module introduces important anatomical terms and describes the concepts required to understand the processes involved in the functioning of organ systems and the maintenance of homeostasis in vertebrate species, including humans, food producing animals, companion animals and other species addressed within the programmes this module has been validated for. A broad knowledge of normal body structure and functioning provided by this module will be invaluable for students studying modules within the animal related programmes such as *Companion Animal Studies*, *Principles of Animal Health*, and *Animal Disease Sciences*. For those studying food related programmes the module will be invaluable for the study of Well-being Through the Lifecycle and later modules such as *Advanced Aspects of Nutrition*. This module is designed to be a prerequisite (for some courses) to either *Veterinary Physiology* or *Applied Anatomy and Physiology*.

## Adaptive Biology

**Year of study** 1  
**Code** A4002C17  
**Credits** 15  
**Core/option** Core  
**Module contact** [Professor Mark Rutter](#)

This module provides a broad overview of how the process of evolution through Darwinian natural selection has resulted in the diversity of life seen on Earth. Historic theories of evolution are evaluated, and the mechanisms underpinning evolution are explored, from microevolution, through speciation to macroevolution. The role of DNA and mechanisms of inheritance are studied, as is animal taxonomy. The evolution of humans is considered, along with the history and process of animal domestication. The effects of evolution and domestication on animal physiology and behaviour are explored. The module is designed to give the students a deeper understanding of evolution and its role underpinning the biological sciences.

## Introduction to Animal Welfare, Behaviour and Ethics

**Year of study** 1  
**Code** A4009C17  
**Credits** 15  
**Core/option** Core

This module will introduce students to the science of animal behaviour and the importance of behaviour in our understanding of animal welfare. It will also consider the ethics of society's usage of different types of animals and the role of legislation and different organisations in the promotion of the interests of animals. Examples will be drawn from a range of diverse species and scenarios to illustrate the principles and practices discussed.

The content of this module will be of benefit to anyone considering working either directly or indirectly with animals in a range of environments. An appreciation of the science of animal behaviour and welfare and how underlying ethical values may influence the acceptability of animal use, will enhance the ability of the individual to undertake welfare assessments of the animals they are responsible for. The knowledge and understanding gained in the module will be an important foundation for those going on to study the module Principles of Animal Welfare and Behaviour.

## Principles of Animal Health

**Year of study** 1  
**Code** A4011C17  
**Credits** 15  
**Core/option** Core  
**Module contact** [Dr Malgorzata Behnke](#)

The immune system of domestic animals faces challenges from micro-organisms and parasites on a daily basis. Furthermore, the general public are at risk from zoonotic micro-organisms and parasites from the animals they keep and come in to contact with.

This module aims to develop students' knowledge and understanding of the micro-organisms and parasites that are important in animal health and the processes by which animals defend themselves against invasions of foreign organisms. This provides a crucial first step in understanding how these diseases can be controlled and will facilitate future learning in other modules which focus in more detail on control measures. Zoonotic risks are highlighted to enable students to identify at-risk situations and populations.

## Research Methods for Environmental Scientists

**Year of study** 2  
**Code** C501017  
**Credits** 15  
**Core/option** Core  
**Module contact** [Dr Andrew Cherrill](#)

The module develops the skills and knowledge necessary to successfully complete the Honours Research Project. Enhanced research confidence will also be an employability skill for the Placement Period and careers on graduation.

The module will cover the key elements of the research process, set in the context of the student's own course discipline. Students will examine the academic role of research and how it informs professional and managerial practice. They will enhance their ability to locate, select and critically evaluate information associated with a particular problem, using a range of sources and particularly peer reviewed empirical studies. By carrying out statistical analysis using appropriate software, the students will develop their ICT skills and further their understanding of the role of statistics in the research process.

## Animal Biotechnology and Genetics

**Year of study** 2  
**Code** A5004C17  
**Credits** 15  
**Core/option** Core  
**Module contact** [Dr Sandy Mackenzie](#)

This module develops the principles of animal breeding, genetics and biotechnology. It will cover the application of current biotechnology technologies used to enhance animal production, health and breeding. The knowledge gained from this module leads on from Bioscience for Agriculture and Animal Production Systems and complements other modules in which the key features of biotechnology and genetics are discussed.

## Animal Ethics

**Year of study** 2  
**Code** A5014C17  
**Credits** 15  
**Core/option** Core  
**Module contact** [Mr Stephen Baugh](#)

Most of us interact with animals on a daily basis, whether that be via our pets, via commercial animals in a work environment or through the animal products that most of us eat. Through these interactions animals are treated by humans in particular ways dependent on many factors including species, utility, religious or cultural beliefs and beliefs based on an animal's sentience or intrinsic value. This module considers our interactions with animals and explores the challenges we face when making moral judgements about how we utilise and treat animals. We will consider many questions that underpin our beliefs about other species and our interactions with them. How should we treat animals? Is it acceptable to use animals for our own benefit? Do animals have intrinsic value? Do animals have rights?

The main ethical theories that are useful when exploring these issues are discussed and explained and examples of how these theories can be applied to our interactions with animals are discussed.

## **Aquatic Ecosystems**

**Year of study** 2  
**Code** C17  
**Credits** 15  
**Core/option** Core

Please contact the course manager for details of this module.

## **Principles of Animal Behaviour and Welfare**

**Year of study** 2  
**Code** A5008C17  
**Credits** 15  
**Core/option** Core  
**Module contact** [Dr Graham Scott](#)

Their complex behaviour is one of the main factors that distinguish the Animalia from the other Kingdoms of Life. This module aims to explore the richness and diversity of the behaviour we see in the animal kingdom, considering the various factors that have influenced its evolution. Although there will be an emphasis on the more complex behaviour patterns seen in the higher animals, this module will consider the behaviour of animals in general, and will not focus on just the domesticated species. This diverse approach will help in the understanding of the general principles which underpin the development of the various patterns of behaviour we observe in animals.

Animal welfare is of major concern to those working in the animal industry as well as the general public. In this module, students are encouraged to consider the issues that affect the welfare of many groups of animals such as farm, companion, zoo and research animals. The physiological and behavioural changes which occur when welfare is compromised will be studied and how these may be used to assess an animal's welfare status. The philosophical and ethical considerations of how we use animals will be discussed and an overview is given of the legislation which governs animal welfare across a range of species.

## **Pollution, Ecology and Brownfield Reclamation**

**Year of study** 2  
**Code** C5012C17  
**Credits** 15  
**Core/option** Core  
**Module contact** [Dr William Hartley](#)

The aim of the module is to interpret the effects of anthropogenic pollution on ecosystems. You will evaluate, monitor and quantify the ecological impact of environmental pollution and the scientific and methodological problems associated with contaminated land reclamation. You will investigate patterns of environmental contamination, accumulation and chronic toxicity caused by toxic metals and other hazardous wastes and the response of plants and animals to pollution, the evolution of pollution tolerance and the effectiveness of bioremediation treatments.

## Wildlife Identification and Conservation

**Year of study** 2  
**Code** C5011C17  
**Credits** 15  
**Core/option** Core  
**Module contact** [Nicky Hunter](#)

This module aims to provide students with an extension of knowledge from the level 4 ecology module and to focus primarily on the synthesis and analysis of the ecological requirements of species and habitats, and the issues around conservation and funding currently in the UK. In order to fully understand the ecology of species, correct identification and adaptation features for the major groups of fauna and flora needs to be recognised.

A practical knowledge and skills-based understanding of the selection and use of identification keys and community classification systems is one of the corner stones to effective assessment of biodiversity for conservation. Students will develop practical knowledge of, and skills in, the use of species identification techniques. Particular attention will be focused on species that are associated with the UK countryside, but the module will also address globally applicable general principles and concepts. Essentially a hands-on approach to learning is encouraged introducing students to the flora and fauna found in a range of habitats which will reinforce the competences of survey skills studied previously.

## Environmental Quality and Protection

**Year of study** 2  
**Code** C5015C17  
**Credits** 15  
**Core/option** Core  
**Module contact** [Paul Lewis](#)

The maintenance of high quality soil, water and air is an essential component of sustainable development. The countryside is used in a wide variety of ways, each of which can have an impact on the environment. For example, pesticides and fertilisers used in agriculture, fish farming and forestry, if not carefully controlled, may affect the air, water and soil quality and eventually contaminate food. The disposal of wastes, access to the countryside for leisure and amenity use and the introduction of new technology may also have an environmental impact. Changes to ecosystems resulting from the emission of greenhouse gases and ozone depleters could significantly affect the rural landscape.

This module will allow the student to define what is meant by soil, water and air quality and to identify some of the major risks to environmental quality arising from our varied use of the countryside. Approaches to managing the countryside so as to maintain or improve the environmental quality will then be evaluated together with assessment of appropriate environmental legislative requirements.

- Select appropriate approaches to assessing soil, air and water quality
- Identify and evaluate the severity of the various risks to soil, air and water quality
- Formulate strategies for protecting soils, air and water and for protecting the countryside from the risk of pollution
- Compare the current status of a site with the appropriate environmental standard(s).

## Placement year

**Year of study** 3  
**Core/option** Core

Read our dedicated [Placement Learning](#) pages for information on the many benefits of the placement year.

## Honours Research Project

**Year of study** 4  
**Code** HRPROJ  
**Credits** 30  
**Core/option** Core

To qualify for an honours degree a student must demonstrate the capacity for sustained, independent and high quality work. One of the most important vehicles for the demonstration of this capacity, and for developing the necessary skills, is the individual Honours Research Project. Each student will therefore be required to complete such a project under the general supervision of a member of staff and present the results in a project report and in a viva voce exam, with two tutors, which will also test to a high level, skills of communication and rational argument. This major exercise represents one-quarter of the final year studies and will therefore have an important influence on the classification of award.

## Geographical Information Systems and Land Use

**Year of study** 4  
**Code** C6009C17  
**Credits** 15  
**Core/option** Core  
**Module contact** [Dr Andy Wilcox](#)

Land management is a complex process involving a combination of agricultural, environmental, recreational and social issues. Geographical Information Systems (GIS) allow storage, analysis and dissemination of spatial information are an essential tool for resource management. This module will provide students with an overview of GIS theory, application and software and allow students to develop practical skills relating to spatial data capture, analysis and presentation using the ESRI ArcGIS platforms.

## Applied Ecology for Management

**Year of study** 4  
**Code** C6003C17  
**Credits** 15  
**Core/option** Core  
**Module contact** [Dr Nicola Randall](#)

Humans depend upon biological processes for their continued existence and for the provision of ecosystems services. The high rates of biodiversity loss remain the subject of concern. This module aims to provide an understanding of the concepts of biodiversity and of ecosystem services, and the use of biodiversity as an ecosystem service provider

In order that biodiversity may be conserved or exploited sustainably, it is important to have an understanding of how populations and communities of organisms are distributed and function and how they react to disturbance. This module is designed to provide students with a background to the complexities of community organization and the general factors that affect community stability. The module subsequently demonstrates how ecological science can be applied to real world conservation and management situations such as the design of nature reserves, pest control, and the sustainable harvesting of populations.

## Environment and Geography Field Course

**Year of study** 4  
**Code** C6007C17  
**Credits** 15  
**Core/option** Core  
**Module contact** [Dr Andy Wilcox](#)

Sustainable solutions to environmental problems are often complex and require a combination of different disciplines in order to achieve an acceptable outcome. Typically, such activities are carried out by a single project team or collection of project teams that each offer their own area of expertise to the solution. This module allows students to develop their high level skills and abilities by undertaking a team project based on a real situation or issue. The project will be focused around a residential field course and combine elements of the entire CEWG portfolio, including aspects of countryside, environmental and geographical management.

## **Environmental Assessment and Management**

**Year of study** 4  
**Code** C6008C17  
**Credits** 15  
**Core/option** Core  
**Module contact** [Emma Pierce-Jenkins](#)

Environmental protection and enhancement is a crucial element of achieving sustainable development and features heavily in International, European and UK legislation and policy, a key requirement of which is that potential environmental impacts of human activities are identified and considered in decision making.

In seeking to protect our environment and deliver sustainable development it is crucial that we are able to recognise when and how human activity will impact upon the environment and how best to mitigate and manage those impacts. This module will examine the relevance and relative merits of a range of formal processes for assessing likely environmental impacts of human interaction with our environment. It will build upon earlier modules relating to environmental policy and legislation, as well as developing conservation, environment and planning themes from earlier modules.

It studies in detail Environmental Impact Assessment (EIA) and Environmental Management Systems (EMS) in terms of legislative compliance, assessment techniques, environmental protection and mitigation strategies etc. and introduces Strategic Environmental Assessment (SEA)/ Sustainability Appraisal.

## **Applied Companion Animal Health, Welfare and Behaviour**

**Year of study** 4  
**Code** A6007C17  
**Credits** 15  
**Core/option** Core  
**Module contact** [Mr Stephen Baugh](#)

An integrated understanding of companion animal health, welfare and behaviour is essential for the development of companion animal management programmes that ensure optimum welfare.

This module is designed to provide a detailed knowledge of the factors involved in the aetiology and development of common diseases seen in companion animals (cats, dogs, small mammals, birds and reptiles) and develops the skills required to recognise signs of ill health in animals and to develop disease control and prevention strategies.

The behaviour of companion animal species will be considered, how health can influence behaviour, why certain behaviours may be suppressed in domestic settings and how this may lead to the development of pathology and inappropriate or abnormal behaviours. The prevention and control of behavioural problems will also be considered.

Aspects of animal physiology, nutrition, health and general husbandry introduced in earlier modules will form an essential background for this module.

## **Management of Captive Aquatic Systems**

**Year of study** 4

**Code** C17

**Credits** 15

**Core/option** Core

**Module contact** [Dr Tharangani Herath](#)

Please contact the course manager for details of this module.