Swansea University
Prifysgol Abertawe

FACULTY OF SCIENCE AND ENGINEERING

UNDERGRADUATE STUDENT HANDBOOK

Year 1 (FHEQ LEVEL 4)

ZOOLOGY

UNDERGRADUATE PROGRAMMES

SUBJECT SPECIFIC
PART TWO OF TWO
MODULE AND COURSE STRUCTURE
2022-23

DISCLAIMER

The Faculty of Science and Engineering has made all reasonable efforts to ensure that the information contained within this publication is accurate and up-to-date when published but can accept no responsibility for any errors or omissions.

The Faculty of Science and Engineering reserves the right to revise, alter or discontinue degree programmes or modules and to amend regulations and procedures at any time, but every effort will be made to notify interested parties.

It should be noted that not every module listed in this handbook may be available every year, and changes may be made to the details of the modules. You are advised to contact the Faculty of Science and Engineering directly if you require further information.

The 22-23 academic year begins on 19 September 2022

Full term dates can be found here

DATES OF 22-23 TERMS

19 September 2022 – 16 December 2022

9 January 2023 – 31 March 2023

24 April 2023 – 09 June 2023

SEMESTER 1

19 September 2022 – 27 January 2023

SEMESTER 2

30 January 2023 – 09 June 2023

SUMMER

12 June 2023 – 22 September 2023

IMPORTANT

Swansea University and the Faculty of Science of Engineering takes any form of **academic misconduct** very seriously. In order to maintain academic integrity and ensure that the quality of an Award from Swansea University is not diminished, it is important to ensure that all students are judged on their ability. No student should have an unfair advantage over another as a result of academic misconduct - whether this is in the form of **Plagiarism**, **Collusion** or **Commissioning**.

It is important that you are aware of the **guidelines** governing Academic Misconduct within the University/Faculty of Science and Engineering and the possible implications. The Faculty of Science and Engineering will not take intent into consideration and in relation to an allegation of academic misconduct - there can be no defence that the offence was committed unintentionally or accidentally.

Please ensure that you read the University webpages covering the topic – procedural guidance here and further information here. You should also read the Faculty Part One handbook fully, in particular the pages that concern Academic Misconduct/Academic Integrity. You should also refer to the Faculty of Science and Engineering proof-reading policy and this can be found on the Community HUB on Canvas, under Course Documents.

Welcome to the Faculty of Science and Engineering!

Whether you are a new or a returning student, we could not be happier to be on this journey with you.

This has been a challenging period for everyone. The COVID-19 pandemic has prompted a huge change in society as well as how we deliver our programmes at Swansea University and the way in which you study, research, learn and collaborate. We have been working hard to make sure you will have or continue to having an excellent experience with us.

We have further developed some exciting new approaches that I know you will enjoy, both on campus and online, and we cannot wait to share these with you.

At Swansea University and in the Faculty of Science & Engineering, we believe in working in partnership with students. We work hard to break down barriers and value the contribution of everyone. Our goal is an inclusive community where everyone is respected, and everyone's contributions are valued. Always feel free to talk to academic staff, administrators, and your fellow students - I'm sure you will find many friendly helping hands ready to assist you.

We all know this period of change will continue and we will need to adapt and innovate to continue to be supportive and successful. At Swansea we are committed to making sure our students are fully involved in and informed about our response to challenges.

In the meantime, learn, create, collaborate, and most of all – enjoy yourself!

Professor Johann (Hans) Sienz
Interim Pro-Vice Chancellor/Interim Executive Dean
Faculty of Science and Engineering

Faculty of Science and Engineering	
Interim Pro-Vice Chancellor/Interim Executive Dean	Professor Johann Sienz
Head of Operations	Mrs Ruth Bunting
Associate Dean – Student Learning and Experience (SLE)	Professor Paul Holland
School of Biosciences, Geography and Physics **Head of School: Siwan Davies**	
School Education Lead	Dr Laura Roberts
Head of Biosciences	Professor Geoff Profitt
Biosciences Programme Director	Dr Wendy Harris
Year Coordinators	Year 1 – Dr Chris Lowe Year 2 – Dr Kevin Arbuckle Year 3 – Dr Ed Pope MSc – Dr Aisling Devine

STUDENT SUPPORT

The Faculty of Science and Engineering has two **Reception** areas - Engineering Central (Bay Campus) and Wallace 223c (Singleton Park Campus).

Standard Reception opening hours are Monday-Friday 9am-5pm.

The **Student Support Team** provides dedicated and professional support to all studentsin the Faculty of Science and Engineering. Should you require assistance, have any questions, be unsure what to do or are experiencing difficulties with your studies or in your personal life, our team can offer direct help and advice, plus signpost you to further sources of support within the University. There are lots of ways to get information and contact the team:

Email: studentsupport-scienceengineering@swansea.ac.uk (Monday–Friday, 9am–5pm)

Call: +44 (0) 1792 295514 and 01792 6062522 (Monday-Friday, 10am–12pm, 2–4pm).

Zoom: By appointment. Students can email, and if appropriate we will share a link to our Zoom calendar for students to select a date/time to meet.

The current student **webpages** also contain useful information and links to otherresources:

https://myuni.swansea.ac.uk/fse/coe-student-info/

READING LISTS

Reading lists for each module are available on the course Canvas page and are also accessible via http://ifindreading.swan.ac.uk/. We've removed reading lists from the 22-23 handbooks to ensure that you have access to the most up-to-date versions. Access to print material in the library may be limited due to CV-19; your reading lists will link to on-line material whenever possible. We do not expect you to purchase textbooks, unless it is a specified key text for the course.

THE DIFFERENCE BETWEEN COMPULSORY AND CORE MODULES

Compulsory modules must be **pursued** by a student.

Core modules must not only be **pursued**, but also **passed** before a student can proceed to the next level of study or qualify for an award. Failures in core modules must be redeemed.

Further information can be found under "Modular Terminology" on the following link - https://myuni.swansea.ac.uk/academic-life/academic-regulations/taught-guidance/essential-info-taught-students/your-programme-explained/

FIELDCOURSES AND PRACTICALS

Year 2 Local Residential Field courses

After successful completion of Year 1, you will take a compulsory Year 2 local residential field course in your subject area usually in early September, before induction week. Information regarding finals dates is sent early in the second semester.

Practical Attendance

Modules have up to 3 weeks of practical work and, when a module is running, students taking that module will work in a laboratory for approximately 3 hour slots on **one** day (time of practical may vary between modules). The practicals for BIO – prefixed modules will take place in **Laboratory 115 or 118** in the Wallace Building or **Laboratory M100** in the Margam Building. There are also some computer-based practical classes, please refer to your timetable for the date and location of these. You lecturer will inform you of the correct session to attend. **You can only attend the session that you have been allocated.**

It is particularly important that students should attend at the start of each practical class as it is then that the work for the session is explained and late arrival may well jeopardise your chance of understanding the content of that class.

The lecturers delivering the practicals will inform students how practical work should be submitted for assessment. Sometimes you will be told that practical work for marking will be collected from you at the end of the laboratory class. For other practicals you will submit onto Turnitin through Canvas.

Attendance at practical classes is compulsory, and absence must be covered by Extenuating Circumstances or will result in a Zero for associated assessment.

For practical classes each student will require the following:-

(a) A **laboratory overall**; students are expected to wear an overall during practical classes and will **not** be admitted to a class unless they do so.

(b) **Safety glasses/goggles**; these must be brought to all practical classes and must be worn unless the lecturer in charge allows dispensation.

(c) **Your own paper** and **pencils** etc.

(d) **Dissection kit**: standard dissection kit containing forceps, seekers, scalpels, scissors and a hand lens.

If you do not already have them, laboratory coats, safety glasses and dissection kits should be purchased before the start of your practical.

USE OF ANIMALS IN TEACHING - POLICY STATEMENT

We ensure a responsible and ethical policy in the use of living or dead animals in teaching. We ensure a minimum number of animals will be used in any class that requires them and always seek alternatives to the use of animals where possible. The use of live animals for teaching is reconsidered at regular intervals and subject to strict ethical reviews. In addition to conformity to Home Office regulations, we endorse an approach which emphasises the importance of avoiding trivial exercises, minimising stress, choosing the right species, ensuring correct sample size and minimising durations of experiments.

There are clear moral and technical distinctions between vivisection (surgery on live animals) and dissection and these should be appreciated. In Swansea, **no** student practicals involve vivisection as the term is generally understood, however a small of practicals may involve the use of dead animals. Students and staff are expected to handle animal material respectfully and sparingly.

The use of animal material **is not** a necessary component in the training of Bioscientisits and we **do** use alternatives (videos, models and museum material) wherever possible. **Alternative assessments will be made available if you choose not to participate.**

Year 1 (FHEQ Level 4) 2022/23
Zoology
BSc Zoology[C300]
BSc Zoology with a Year Abroad[C301]
BSc Zoology with a Year in Industry[C384]

Semester 1 Modules	Semester 2 Modules
BIO104 **Cellular & Microbial Biology** **20 Credits** **Dr E Kenyon**	**BIO108** **Evolution and Genetics** **20 Credits** **Dr HJ Nichols/Dr AJ King**
BIO109 **Core Skills for Biological Sciences** **20 Credits** **Dr SC Hocking**	**BIO112** **Life in the Oceans** **20 Credits** **Dr CD Lowe/Dr EC Pope**
BIO111 **Botany and Ecology** **20 Credits** **Dr PJ Neyland/Dr JN Griffin/Dr MJ Perkins**	**BIO114** **Animal Diversity and Behaviour** **20 Credits** **Dr GR Thomas/Dr LJ Roberts**
Total 120 Credits	

BIO104 Cellular & Microbial Biology

Credits: 20 Session: 2022/23 September-January

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Dr E Kenyon

Format: 23 hours of lectures, including revision lectures; 9 hours practical sessions (2.5hrs, 1.5hrs, 1hr and 2x 2hrs). Contact hours will be delivered through live activities on-campus activities, and may include, for example, lectures, seminars and practical sessions.

Delivery Method: All Programmes will employ a blended approach to delivery using the Canvas Digital Learning Platform for live and self-directed online activity, with live and self-directed on-campus activities each week. Students may also have the opportunity to engage with online versions of sessions delivered on-campus

Blended learning; in classroom and laboratory lectures, small group discussion and quizzes, laboratory practicals, and e-learning (online resources such as videos, animations, and scientific papers). Primarily on campus.

Module Aims: This module provides a broad introduction to fundamental concepts in cell biology, including the biochemistry and structure of the cell and cell diversity. Life is more abundant than what we can see with our eyes. Plants, animals and humans are a small minority among living organisms because there is no niche on earth which is not colonized by microbes (i.e., archaea, bacteria, fungi, protists, and viruses). As part of this module, you will learn that microbes were the first form of life on earth, support all kinds of life, and play a vital role in shaping the planet. Students will gain practical experience in handling and culturing microorganisms, microscopy and spectroscopy.

Module Content: The following distribution of lecture material is indicative; due to the interactive mode of teaching it is subject to modification.

Cellular Biology

- Cell theory and types (eukaryotes and prokaryotes)
- Chemical components of cells: chemical bonds, structures and assembly of macromolecules (nucleic acids, proteins, carbohydrates, lipids)
- Biomembranes and Organelles (structures and functions)
- -Membrane transport: cellular recognition and signal transduction mechanisms
- Metabolic pathways (glycolysis, TCA cycle and ATP as an energy currency)
- Cytoskeletal elements
- Cell birth, life and death (necrosis, apoptosis)

Microbial Biology:

- Introduction: a microbial world.
- Prokaryote cell exterior and appendages.
- Prokaryote cell interior.
- Microbial cell growth, division and metabolism.
- Viruses.
- Inheritance and information flow among microbes.
- Cell differentiation and development.
- Bacterial and archaeal diversity.
- Protists
- Filamentous and unicellular fungi.
- The human microbiome
- Microbial pathogenesis.

Practical classes: bacterial culture and chemistry, microscopy & staining, growth conditions, bacterial identification, spectrophotometry and protein standard curves

Intended Learning Outcomes: By the end of the module students should be able to:

LO1) Recognise different cell types
LO2) List the (sub)cellular structures of prokaryotic and eukaryotic cells
LO3) Describe the role of molecules in different biochemical pathways (Glycolysis, ATP synthesis, Krebs Cycle, fermentation), and their regulating mechanisms
LO4) Discuss mechanisms of cellular recognition and signal transduction
LO5) Undertake a series of laboratory experiments to develop skills in aseptic technique, culturing of microbes, and cellular staining.
LO6) List the variety of bacterial shapes and morphologies
LO7) Discuss the importance of microbes in the environment, their ecology and evolution
LO8) Produce a series of laboratory reports, including data in tabular and graphical formats
LO9) Gain practical experience in the use of micropipettes, microscopes and spectrophotometers
LO10) Estimate microbial growth, explain the molecular basis of microbial cell division, and identify how growth is fuelled in microbes.
LO11) Comprehend human-microbe interactions

Assessment: Examination (50%)
Coursework 1 (3%)
Coursework 2 (3%)
Coursework 3 (3%)
Coursework 4 (10%)
Coursework 5 (3%)
Coursework 6 (10%)
Coursework 7 (3%)
Coursework 8 (10%)
Coursework 9 (3%)
Coursework 10 (2%)

Assessment Description: Examination: 100 multiple choice questions (MCQ) (50%)
Coursework: 3 practical components outlined in the syllabus (30%) and 7 online laboratory simulations (20%)

Moderation approach to main assessment: Not applicable

Assessment Feedback: Formative feedback on coursework and examinations. Contact lecturer as required.

Failure Redemption: Resit examination and re-submission of coursework.

Additional Notes: Delivery of both teaching and assessment will be blended including live and self-directed activities online and on-campus.

Normally available to elective, visiting or exchange students. Please note that any failures are redeemed during the August resit period, so you must ensure your availability.

BIO108 Evolution and Genetics

Credits: 20 Session: 2022/23 January-June

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Dr HJ Nichols, Dr AJ King

Format: 21h lectures
14h practical sessions
5h feedback sessions

Contact Hours will be delivered through a blend of live activities online and on-campus, and may include, for example, lectures, seminars, practical sessions and Academic Mentoring sessions.

Delivery Method: All Programmes will employ a blended approach to delivery using the Canvas Digital Learning Platform for live and self-directed online activity, with live and self-directed on-campus activities each week. Students may also have the opportunity to engage with online versions of sessions delivered on-campus

Variety of learning methods (lectures, discussion groups, practicals and e-learning)

Module Aims: "Nothing in Biology makes sense except in the light of evolution" was the title of a 1973 essay by the evolutionary biologist Theodosius Dobzhansky. The module links fundamental understanding of molecular biology and genetics to a broader appreciation of evolution and how it shapes the natural world around us.

Module Content: Lectures:

Part 1 Evolution
- Defining biological evolution, natural selection
- Mechanisms of change
- Micro-evolution, Macro-evolution
- Speciation
- Sexual selection
- Pylogenetic ("family") trees
- Explaining specific evolutionary events
- Evolutionary responses to environmental change and extinction
- Human evolution

Part 2 Genetics
- The genetic material: DNA, chromosomes and chromatin
- DNA replication, homologous recombination and repair mechanisms.
- Transcription
- RNA splicing and processing
- Translation: using the genetic code
- Transcription regulation
- Noncoding and regulatory RNAs
- Genes and genomes
- Methods in molecular biology
- Epigenetics

Practical sessions (subject to change):

(1) Perform experimental genetic techniques;
(2) Use basic molecular techniques.
(3) In small groups, discuss the breadth, depth and power of evolutionary thinking using examples from: The fossil record; Habitats; Molecular processes and present this to the class;
(4) Design and carry out a study to explore the evolution of sexually selected traits in birds.

Intended Learning Outcomes: At the end of the module students will be able to:

LO1: Define biological evolution and distinguish among of the mechanisms of evolution (e.g. mutation, migration, genetic drift, natural and sexual selection).
LO2: Interpret phylogenetic ("family") trees and use them to explain specific evolutionary events, micro-evolution, macro-evolution, and speciation.
LO3: Use Darwin's basic conception of evolutionary change and diversification to explain phenomena across the many sub-disciplines of biology and deal with objections to evolution.
LO4: To acquire knowledge regarding the basic molecular mechanisms of evolution, including the cell cycle, the genetic material, DNA replication, transcription and translation, and how molecular events such as DNA damage, repair and mutation relate to evolution.
LO5: Develop an understanding of genetic and non-genetic inheritance, and how these relate to evolution.
LO6: Appreciate the wider applications of genetics, for example to medicine and conservation.

Assessment: Examination (50%)
Coursework 1 (25%)
Coursework 2 (15%)
Coursework 3 (10%)

Assessment Description: CW1: Sexual selection report, 25%
CW2: Genetics lab practical report, 15%
CW3: Labster practicals, 10%
Exam: Multiple choice, 50%

Moderation approach to main assessment: Not applicable

Assessment Feedback: Formative feedback on coursework and examinations. General feedback sessions and Individual feedback with lecturer as appropriate.

Failure Redemption: Re-submission of coursework, re-sit of examination

Additional Notes: Delivery of both teaching and assessment will be blended including live and self-directed activities online and on-campus.

Normally available to elective, visiting or exchange students. Please note that any failures are redeemed during the August resit period, so you must ensure your availability.

BIO109 Core Skills for Biological Sciences

Credits: 20 Session: 2022/23 September-January

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Dr SC Hocking

Format: 23 lectures, 6 workshops, 3 PC labs, 1 laboratory chemistry practical, 1 feedback lectures.
Contact Hours will be delivered through a blend of live activities online and on-campus, and may include, for example, lectures, seminars, practical sessions and Academic Mentoring sessions.

Delivery Method: All Programmes will employ a blended approach to delivery using the Canvas Digital Learning Platform for live and self-directed online activity, with live and self-directed on-campus activities each week. Students may also have the opportunity to engage with online versions of sessions delivered on-campus

Lectures, small group teaching, ICT workshops, 1 lab practical and e-learning

Module Aims: This module is divided into three sections, scientific writing, data analysis and chemistry, which will equip students with the core skills needed throughout their degree program. The content of the module includes understanding the different types of data that can be measured and collected, the tools to formally present and analyse data and data analyses, and practical applications of spreadsheet software. There is a 'hands on' focus on dealing with data and developing basic mathematical and statistical analytical skills. Furthermore this module introduces first year undergraduates to the key skill of scientific writing, developing their ability to locate, understand, evaluate and communicate scientific information. Basic chemistry will be covered as a foundation to its importance to biological processes.

Module Content: The module will comprise of the following subjects:
· Using maths in Science
· Understanding data
· Types of data
· Units and measurement
· Using data bases
· Preparing figures, graphs and tables
· Sampling concepts
· Hypothesis testing
· Descriptive statistics
· Basic inferential statistics

- Basic rules to scientific writing
- Writing essays and practical reports
- Introduction to sources of scientific information and science in the public domain
- Essay writing
- Referencing

· Organic chemistry
· Stereochemistry
· Transition metal chemistry
· laws of kinetics
· chemical equilibria

Careers Development

- Resilience
- Developing Self Awareness
- Career options
- action planning
- CV’s cover letters
- creating a LinkedIn page

The module is supported by both lectures and guided / self directed computer sessions and workshops which include:

- Introduction to Spreadsheets & Databases
- Plotting data in Spreadsheet Packages
- Displaying data visually
- Simple Statistics by Hand
- Basic rules to scientific writing
- Essays and practical reports
- Utilising internet sources and search engines
- Referencing

Intended Learning Outcomes: LO1) Classify the different type of data and describe how they are measured
LO2) Recognise and apply standard units of measurement.
LO3) Demonstrate how and when to present data in tables or different types of figures and graphs.
LO4) Demonstrate practical knowledge of the use of databases and spreadsheet applications.
LO5) Apply knowledge of the use of descriptive and inferential statistics, including parametric and non-parametric tests to evaluate statistically significant relationships and/or differences.
LO6) Differentiate between the different statistical analyses associated with different types of data.

LO7) Identify and evaluate different forms of scientific communications and their applications.
LO8) Locate and utilise internet sources of scientific information such as peer reviewed journal articles using appropriate search engines.
LO9) Communicate, structure and format scientific information in a number of different writing styles encompassing essay writing and practical reports.
LO10) Utilise, format and structure references in a scientific essay
LO11) Recognise the problems and risks associated with different forms of academic misconduct.

LO12) Explain why chemistry is important to biology
LO13) Describe the basic structure of atoms, molecules etc
LO14) Describe different types of chemical bond and have a basic understanding of chemical reactions.
LO15) Know how to make up molar solutions
LO16) Understand what pH is and how it is important in biological reactions
LO17) Explain the basic chemical structure of proteins, fats and carbohydrate
LO18) Describe the role of different metals in biology.
LO19) Understand the importance of self-reflection and career development skills

Assessment: Coursework 1 (25%)
Coursework 2 (15%)
Coursework 3 (25%)
Coursework 4 (25%)
Coursework 5 (10%)

Assessment Description:
Coursework 1: Essay
Coursework 2: Displaying data visually
Coursework 3: Chemistry report
Coursework 4: Statistics Assignment
Coursework 5: Scientific writing portfolio - Blackboard tests

Moderation approach to main assessment: Not applicable

Assessment Feedback: Feedback is given directly on submitted continuous assessment assignments through annotated scripts, feedback forms and via a feedback lecture session as appropriate

Failure Redemption: Resit examination, resubmission of coursework of failed element

Additional Notes: Delivery of both teaching and assessment will be blended including live and self-directed activities online and on-campus.

Normally available to elective, visiting or exchange students. Please note that any failures are redeemed during the August resit period, so you must ensure your availability.

BIO111 Botany and Ecology

Credits: 20 Session: 2022/23 September-January

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Dr PJ Neyland, Dr JN Griffin, Dr MJ Perkins

Format: 24 hours in person live lectures (or Zoom if necessary)
12 hours laboratory practicals
3 hours field practical
Additional Zoom sessions for Q and A.
Contact Hours will be delivered through a blend of live activities online and on-campus, and may include, for example, lectures, seminars, practical sessions and Academic Mentoring sessions.

Delivery Method: All Programmes will employ a blended approach to delivery using the Canvas Digital Learning Platform for live and self-directed online activity, with live and self-directed on-campus activities each week. Students may also have the opportunity to engage with online versions of sessions delivered on-campus

Blended learning: Synchronous and asynchronous online lectures, laboratory and field practicals, eLearning, Canvas VLE used to disseminate information, short lectures, Zoom interactions and quizzes

Module Aims: Botany lectures cover the structure, life cycles and morphology of the major living Divisions of the Plant Kingdom. Floral structure, pollination, fruit dispersal and seed germination are discussed with particular reference to plant/animal interactions. This is followed by lectures that cover the basic anatomy of higher plants, from the cellular to the whole organism level. Lectures on plant physiology will emphasise flowering plants as whole organisms and concentrate particularly on plant-environment interactions. The topics covered are: photosynthesis; water relations; mineral nutrition; organic translocation; growth; developmental physiology. Aspects of plant ecology, plant-herbivore interactions and the importance of plants in medicine will also be covered. The lectures on plants are complemented by two laboratory practical sessions; Lower plant classification is studied by development of a dichotomous key; Basic anatomy and cell structure are studied microscopically; Physiological experiments illustrate aspects of plant water relations. Additionally, taxonomy and classification of species from the major divisions are studied by demonstrations displaying a wide range of specimens, along with examples of flower structure, pollination types and seed/fruit dispersal.
Ecology lectures cover the study of the interactions of organisms with their environment. The topic is divided into four key themes: the individual (conditions and resources, population distribution and abundance, population growth and regulation, population dynamics), species interactions (competition and predation), communities (patterns in space and time) and
ecosystems (flux of energy and matter, food webs and patterns in species richness). A field practical looking at individuals (adaptation to ecological conditions and species area relationships) will develop skills in species identification, ecological sampling and ecological data analysis.
A lecture in plant ecology draws these two concepts together.
Note - lectures here refer to material that is presented on Canvas pages and delivered as live in-person lectures.

Module Content: Syllabus
The following distribution of lecture material is indicative; due to the interactive mode of teaching it is subject to modification.
Botany
•Classification, evolution and life cycles of non-vascular and vascular plants
•Pollination, fertilisation and dispersal in seed plants
•Plant biotechnology, genetic engineering
•Plant growth regulators (hormones)
•Plant growth and repsonses to light
•Water relations
•Mineral nutrition
•Mychorrhiza
•Photosynthesis, translocation
•Photosynthesis and global climate change
•Herbivory, plants, secondary metabolites and medicine

Ecology
•Conditions, resources and the ecological niche
•Population distribution, abundance and life histories
•Population growth, regulation and dynamics
•Competition
•Predation and herbivory
•Communities; patterns in space and time
•Ecosystems; flux of energy and matter
•Food webs
•Patterns in species richness

Final lecture
• Plant ecology; populations, habitats, ecosystems and biomes

Practicals
Botany - Plant anatomy
Botany - Plant physiology experiment
Botany - Plant Kingdoms: taxonomy and classification, bryophytes, pteridophytes, gymnosperms and angiosperms
Ecology - Rocky shore ecology: individuals to communities
(Note order of practicals may change according to weather)

Intended Learning Outcomes: By the end of the module, the student should be able to:
LO1) Describe the evolution, classification and morphology of plants and recognise typical specimens from the Divisions
LO2) Compare and contrast the reproductive strategies and life cycles of plants from the major divisions (vascular and non-vascular plants).
LO3) Describe and illustrate the physical structure of flowering plants from the cellular to the whole plant level.
LO4) Summarise the physiological functioning of flowering plants, their interactions with the environment and their importance in the biosphere.
LO5) Have knowledge of ecology and biological diversity, including structure, function, physiological constraints, evolution and adaptations to the environment
LO5) Become proficient in microscopy and scientific illustration of cells
LO6) Undertake, record, analyse and discuss some basic experiments in plant physiology
LO7) Utilise taxonomic keys and guides to identify and classify organisms across a broad range of phyla during practical investigations
LO8) Utilise field based ecological sampling techniques
LO9) Work as a team and be able to utilise appropriate sampling and surveying techniques so that they can be employed in ecological research and monitoring
LO10) Draw links and identify themes between the range of scientific subject investigated within constructing meaning from oral, written, and numerical information through interpretation and summarising key component
LO11) Analyse and interpret data derived from experimental observations in terms of their significance and in the context of established knowledge utilising appropriate statistical techniques.
LO12) Use relevant literature, information and programme resources to support the design, execution and analysis of practical investigations.

Assessment: Coursework 1 (10%)
Coursework 2 (15%)
Coursework 3 (25%)
Exam - Multiple choice questions (50%)

Assessment Description: Coursework 1: Anatomical drawings of plant cells (microscopy)
Coursework 2: Ecology poster from field practical (adaptations and species-area relationships)
Coursework 3: Laboratory practical report on plant physiology experiment (chemistry and water relations)
Examination: (January) 100 Multiple Choice Questions based on all material taught in Botany and Ecology lectures

Moderation approach to main assessment: Not applicable

Assessment Feedback: Formal feedback in practical classes and lectures
Individual comments on submitted coursework
One to one discussion available in drop-in sessions upon request
Electronic feedback on work submitted online
Formative feedback on Canvas quizzes

Failure Redemption: Resit of examination
Re submission of coursework

Additional Notes: Delivery of both teaching and assessment will be blended including live and self-directed activities online and on-campus.

Normally available to elective, visiting or exchange students. Please note that any failures are redeemed during the August resit period, so students must ensure their availability. Field practical material may be subject to change depending on weather conditions.

BIO112 Life in the Oceans

Credits: 20 Session: 2022/23 January-June

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Dr CD Lowe, Dr EC Pope

Format: 25 h of lectures
6 h laboratory work
4 h of fieldwork
Contact Hours will be delivered through a blend of live activities online and on-campus, and may include, for example, lectures, seminars, practical sessions and Academic Mentoring sessions.

Delivery Method: All Programmes will employ a blended approach to delivery using the Canvas Digital Learning Platform for live and self-directed online activity, with live and self-directed on-campus activities each week. Students may also have the opportunity to engage with online versions of sessions delivered on-campus

Blended learning: lectures, laboratory practicals, fieldwork,workshop, eLearning.

Module Aims: This module introduces students to the largest biome on the planet and the huge variety of life it contains; over 71% of the Earth's surface is covered by ocean and its health is intricately connected with our own. Lectures will consider the formation of ocean basins and key oceanographic processes within them before moving onto the chemical and physical properties of water. The module will introduce students to primary production in the ocean, the huge diversity of life within marine food chains, and key processes in nutrient cycling. Marine ecosystems will be discussed in detail, with focus on those found around the UK, before considering the interaction between humans and the oceans and the challenges faced by marine organisms in an ocean changing because of our activities. This module has been modified to be delivered during the COVID-19 pandemic.

Module Content: Lecture themes:

1. Introduction to the oceans
2. Waves, tides and currents
3. Chemical and physical properties of seawater
4. Plankton and productivity in marine ecosystems
5. Nutrient cycling
6. Microalgae definitions and taxonomy
7. Marine invertebrates
8. Marine fish
9. Marine reptiles, birds and mammals
10. Introduction to marine ecology
11. Estuarine and intertidal systems
12. Shallow seas
13. Deep sea
14. Tropical seas
15. Polar seas
16. UK marine habitats
17. Humans and the oceans
18. The changing oceans

Intended Learning Outcomes: LO1 Describe how oceans form and describe oceanic processes;
LO2 Safely undertake fieldwork in the intertidal habitat;
LO3 Comprehend the physiological functioning of micro- and macroalgae, their interactions with the environment and their importance both in aquatic ecosystems and to humans;
LO4 Explain the drivers of the diversity of marine animal life;
LO5 Describe the variety of marine ecosystems, with particular reference to UK habitats;
LO6 Define concepts underpinning the ecology and diversity of marine ecosystems;
LO7 Explain the interplay between society and the oceans;
LO8 Produce detailed laboratory reports, including data analysis and use of other research to strengthen arguments;
LO9 Discuss the importance of correctly citing academic work;

Assessment:	Examination (50%) Coursework 1 (10%) Coursework 2 (15%) Coursework 3 (15%) Coursework 4 (10%)
Assessment Description: Examination: 100 Multiple Choice Questions based on all material taught in lectures. Coursework 1: construction of standard curve; Coursework 2: mussel feeding; Coursework 3: short exercises to be completed after rocky shore field trip. Coursework 4: kelp report	
Moderation approach to main assessment: Not applicable	
Assessment Feedback: Personal feedback provided on coursework submitted. Direct general feedback during lectures and practical sessions. Formal feedback session to discuss examination results.	
Failure Redemption: Resit of examination Re submission of coursework	
Additional Notes: Delivery of both teaching and assessment will be blended including live and self-directed activities online and on-campus. Normally available to elective, visiting or exchange students. Please note that any failures are redeemed during the August resit period, so you must ensure your availability. Lecture and practical material may be subject to change depending on staff availability and weather conditions.	

BIO114 Animal Diversity and Behaviour

Credits: 20 Session: 2022/23 January-June

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Dr GR Thomas, Dr LJ Roberts

Format: 22 hours lectures
12 hours practicals
2 hr literature review workshop
4 x 1 hr drop in sessions
Contact Hours will be delivered through a blend of live activities online and on-campus, and may include, for example, lectures, seminars, practical sessions and Academic Mentoring sessions.

Delivery Method: All Programmes will employ a blended approach to delivery using the Canvas Digital Learning Platform for live and self-directed online activity, with live and self-directed on-campus activities each week. Students may also have the opportunity to engage with online versions of sessions delivered on-campus

Blended learning: Lectures, workshop, practicals, eLearning

Module Aims: This 20 credit module is divided into two sections and broadly introduces students to the diversity of animal groups, and the study of animal behaviour. The first 12 lectures will consider the taxonomy and physiology of organisms within the animal kingdom, and will provide students with a broad understanding of all animal life, from single celled protozoa through to megafauna such as the blue whale and concluding with human evolution. The following 10 lectures will consider the evolutionary pressures that drive animal behaviour and give rise to the behavioural adaptations witnessed across the animal kingdom today, from learning and cultural transmission, to anti-predatory mechanisms and migration. The section is concluded with a lecture on human behaviour, determining how we are influenced by the same set of natural regulations that govern our wild counterparts. During this module, students will develop their understanding of animal classification, interrelationships and evolution, and will gain valuable practical experience of animal biology. A sister module, BIO114C, will provide the same content but delivered via the medium of Welsh.

Module Content: The following distribution of lecture material is indicative; due to the interactive mode of teaching it is subject to modification.

Introduction to the animal kingdom, evolutionary theories, molecular evolution and taxonomy
The invertebrates: form and function in sponges and radiate animals
Form and function in annelids, molluscs and echinoderms
Arthropod classification, form, function and diversity
Chordate characteristics and development
Fish diversity, form and function
Amphibians and reptiles: the evolution of terrestrial vertebrates
Mammalian diversity and physiology
Human evolution and behaviour

An introduction to ethology and the evolution of behaviour
Proximate mechanisms: senses, hormones and the Central Nervous System
Learning
Cultural transmission
Reproduction
Kinship, cooperation, signalling, and communication
Movements and migrations
Eating, and avoiding being eaten
Aggression and play
Human Behaviour

3 Practicals:
Demonstration of protostome and deuterostome animals
Soft sediment animals
Behavioural observations field trip to Bristol Zoo

1 Workshop (2 hr):
Critical writing and literature reviews

Intended Learning Outcomes: LO1) Knowledge of animal diversity, including classification, key physiological adaptations, their function, physiological constraints, evolution and adaptations in the environment
LO2) Describe the behaviour of animals, with special regard to their ecology and evolution
LO3) Describe the biology of parasites, predators and prey and their influence on host behaviour and population dynamics
LO4) Work as a team and be able to utilise appropriate sampling and surveying techniques so that they can be employed in ecological and behavioural research and monitoring in the marine and terrestrial environment
LO5) Draw links and identify themes between the range of scientific subject investigated within constructing meaning from oral, written, and numerical information through interpretation and summarising key components
LO6) Analyse and interpret data derived from experimental observations in terms of their significance and in the context of established knowledge utilising appropriate statistical techniques.
LO7) Use relevant literature, information and programme resources to support the design, execution and analysis of practical investigations.

Assessment: Examination (50%)
Coursework 1 (10%)
Coursework 2 (10%)
Coursework 3 (30%)

Assessment Description: Examination: 50% June
Coursework 1: 10% June (museum assignment)
Coursework 2: 10% June (fish dissection worksheet)
Coursework 3: 30% June (Bristol zoo behaviour assignment)

Moderation approach to main assessment: Not applicable

Assessment Feedback: Formative feedback from protostome and deuterostome practical
Formal feedback from lecturer, returned coursework with individual comments.
Summative assessment mark from exam

Failure Redemption: Re-sit exam
Re-submission of coursework

Additional Notes: Delivery of both teaching and assessment will be blended including live and self-directed activities online and on-campus.

Normally available to elective, visiting or exchange students. Please note that any failures are redeemed during the August resit period, so you must ensure your availability. Lecture and practical material may be subject to change depending on staff availability and weather conditions.