Swansea University
Prifysgol Abertawe

FACULTY OF SCIENCE AND ENGINEERING

UNDERGRADUATE STUDENT HANDBOOK

YEAR 2 (FHEQ LEVEL 5)

BSC BIOLOGY

DEGREE PROGRAMMES

SUBJECT SPECIFIC
PART TWO OF TWO
MODULE AND COURSE STRUCTURE
2023-24

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 23-24 academic year begins on 25 September 2023

Full term dates can be found here

DATES OF 23-24 TERMS

25 September 2023 – 15 December 2023

8 January 2024 – 22 March 2024

15 April 2024 – 07 June 2024

SEMESTER 1

25 September 2023 – 29 January 2024

SEMESTER 2

29 January 2024 – 07 June 2024

SUMMER

10 June 2024 – 20 September 2024

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.

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.

At Swansea University and in the Faculty of Science and 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, technical and administrative staff, administrators - I'm sure you will find many friendly helping hands ready to assist you. And make the most of living and working alongside your fellow students.

During your time with us, please learn, create, collaborate, and most of all – enjoy yourself!

Professor David Smith
Pro-Vice-Chancellor and Executive Dean
Faculty of Science and Engineering

Faculty of Science and Engineering	
Pro-Vice-Chancellor and Executive Dean	Professor David Smith
Director of Faculty Operations	Mrs Ruth Bunting
Associate Dean – Student Learning and Experience (SLE)	Dr Laura Roberts
School of Biosciences, Geography and Physics	
Head of School	TBC
School Education Lead	Dr Wendy Harris and Dr Sarah Roberts
Head of Biosciences	Professor Luca Borger
Biosciences Programme Director	Dr Ed Pope
Year Coordinators	Head of Foundation Year: Dr Kayleigh Rose Head of Level 1: Dr Chris Lowe Head of Level 2: Dr Kevin Arbuckle Head of Level 3: Dr Penny Neyland Head of MSc: Dr Aisling Devine Head of MRes: Dr Nicole Esteban

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 8.30am-4pm.

The **Student Support Team** provides dedicated and professional support to all students in 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 (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 other resources:

https://myuni.swansea.ac.uk/fse/

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 23-24 handbooks to ensure that you have access to the most up-to-date versions.
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/

Year 2 (FHEQ Level 5) 2023/24
Biology
BSc Biology[C101,C104]
BSc Biology with a Year Abroad[C106]

Compulsory Modules

Semester 1 Modules	Semester 2 Modules
BIO249 **Introduction to field ecology** **15 Credits** **Dr SC Hocking/Dr AP Devine/Dr PJ Neyland/Dr GR Thomas**	**BIO232** **Plant Ecology** **15 Credits** **Dr PJ Neyland/Dr AP Devine/Prof CA Froyd**
BIO252 **Ecological Data Analysis** **15 Credits** **Prof L Borger/Dr N Franconi**	**BIO239** **Ecological Microbiology and the Cycles of Life** **15 Credits** **Prof DC Eastwood**
Total 120 Credits	

Optional Modules
Choose exactly 15 credits
from TB1

BIO228	Parasitology	Dr GR Thomas	TB1	15
BIO234	Animal Conservation and Welfare	Dr HJ Nichols/Dr K Arbuckle/Dr I Fuertbauer/..	TB1	15
BIO235	Molecular Ecology	Dr Micheal Gwilliam	TB1	15
BIO237	Marine Invertebrates	Dr EC Pope	TB1	15
BIO258	Animal Physiology	Dr TM Uren Webster	TB1	15

And
Choose exactly 15 credits
from TB2

BIO224	Ichthyology	Dr EC Pope	TB2	15
BIO229	Tetrapod Evolution	Dr WL Allen/Dr K Arbuckle/Dr C Pimiento/..	TB2	15
BIO230	Entomology	Dr WE Harris	TB2	15
BIO236	Cells and Immunity	Prof AF Rowley/Dr CE Davies	TB2	15
BIO261	Population and Community Ecology	Dr M Lurgi Rivera	TB2	15

And
Choose exactly 15 credits
from either Teaching Block ¿ the maximum credits permitted in a teaching block is 75

BI-200	Professional Development and Careers Planning	Miss VV Wislocka	TB1	0
BIO224	Ichthyology	Dr EC Pope	TB2	15
BIO228	Parasitology	Dr GR Thomas	TB1	15
BIO229	Tetrapod Evolution	Dr WL Allen/Dr K Arbuckle/Dr C Pimiento/..	TB2	15
BIO230	Entomology	Dr WE Harris	TB2	15
BIO234	Animal Conservation and Welfare	Dr HJ Nichols/Dr K Arbuckle/Dr I Fuertbauer/..	TB1	15
BIO235	Molecular Ecology	Dr Micheal Gwilliam	TB1	15
BIO236	Cells and Immunity	Prof AF Rowley/Dr CE Davies	TB2	15
BIO237	Marine Invertebrates	Dr EC Pope	TB1	15
BIO258	Animal Physiology	Dr TM Uren Webster	TB1	15
BIO261	Population and Community Ecology	Dr M Lurgi Rivera	TB2	15

And
Choose exactly 15 credits

BIO231	Year 2 Biological Sciences Literature Review	Dr GR Thomas	TB2	15
BIO231C	Adolygiad Llenyddiaeth Bl 2	Dr GR Thomas	TB2	15

Year 2 (FHEQ Level 5) 2023/24
Biology
BSc Biology with a Year in Industry[C152]

Compulsory Modules

Semester 1 Modules	Semester 2 Modules
BI-200 **Professional Development and Careers Planning** **0 Credits** **Miss VV Wislocka**	**BIO232** **Plant Ecology** **15 Credits** **Dr PJ Neyland/Dr AP Devine/Prof CA Froyd**
BIO249 **Introduction to field ecology** **15 Credits** **Dr SC Hocking/Dr AP Devine/Dr PJ Neyland/Dr GR Thomas**	**BIO239** **Ecological Microbiology and the Cycles of Life** **15 Credits** **Prof DC Eastwood**
BIO252 **Ecological Data Analysis** **15 Credits** **Prof L Borger/Dr N Franconi**	
Total 120 Credits	

Optional Modules

Choose exactly 15 credits
from TB1

BIO228	Parasitology	Dr GR Thomas	TB1	15
BIO234	Animal Conservation and Welfare	Dr HJ Nichols/Dr K Arbuckle/Dr I Fuertbauer/..	TB1	15
BIO235	Molecular Ecology	Dr Micheal Gwilliam	TB1	15
BIO237	Marine Invertebrates	Dr EC Pope	TB1	15
BIO258	Animal Physiology	Dr TM Uren Webster	TB1	15

And

Choose exactly 15 credits
from TB2

BIO224	Ichthyology	Dr EC Pope	TB2	15
BIO229	Tetrapod Evolution	Dr WL Allen/Dr K Arbuckle/Dr C Pimiento/..	TB2	15
BIO230	Entomology	Dr WE Harris	TB2	15
BIO236	Cells and Immunity	Prof AF Rowley/Dr CE Davies	TB2	15
BIO261	Population and Community Ecology	Dr M Lurgi Rivera	TB2	15

And

Choose exactly 15 credits
from either Teaching Block ¿ the maximum credits permitted in a teaching block is 75

BIO224	Ichthyology	Dr EC Pope	TB2	15
BIO228	Parasitology	Dr GR Thomas	TB1	15
BIO229	Tetrapod Evolution	Dr WL Allen/Dr K Arbuckle/Dr C Pimiento/..	TB2	15
BIO230	Entomology	Dr WE Harris	TB2	15
BIO234	Animal Conservation and Welfare	Dr HJ Nichols/Dr K Arbuckle/Dr I Fuertbauer/..	TB1	15
BIO235	Molecular Ecology	Dr Micheal Gwilliam	TB1	15
BIO236	Cells and Immunity	Prof AF Rowley/Dr CE Davies	TB2	15
BIO237	Marine Invertebrates	Dr EC Pope	TB1	15
BIO258	Animal Physiology	Dr TM Uren Webster	TB1	15
BIO261	Population and Community Ecology	Dr M Lurgi Rivera	TB2	15

And
Choose exactly 15 credits

BIO231	Year 2 Biological Sciences Literature Review	Dr GR Thomas	TB2	15
BIO231C	Adolygiad Llenyddiaeth Bl 2	Dr GR Thomas	TB2	15

BI-200 Professional Development and Careers Planning

Credits: 0 Session: 2023/24 September-January

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Miss VV Wislocka

Format: 6 hours consisting of live lectures which will include guest lectures with employers, previous students. Face to face delivery.

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 activities each week.

These modules are delivered through online resources, scheduled Zoom sessions and 1-2-1 meetings. There is self-directed learning required using online resources provided.

Module Aims: This module is a mandatory module for all students who have enrolled (or transferred) onto the Science Industrial Placement Year but is also available to all other Bioscience students.
The module focuses on the underpinning and fundamental requisites required to gain, enter and progress through a successful career.
Learners will be introduced to
(a) sourcing placements, CV writing, and application techniques;
(b) Interview techniques, how to pitch yourself and be successful;
(c) workplace fundamentals and IP awareness, behaviors and expectations; and,
(d) Key employability skills; getting the most from your job or Industrial Placement.

Module Content: How to find placements and the main sites to use,
Cv writing, CV do's and dont's
Writing a cover letter
Assessments centres, interview techniques and mock interviews
How to utilise LinkedIn for your placement search

Intended Learning Outcomes: By the end of this module, students will be able to:

1) Be aware of and possess the essential skills needed to secure placement opportunities; alongside having the skills to apply for relevant placements.

2) Have a general understanding of an interview process and what tools and attributes make a good interview.

3) Discuss and share what is expected within the workplace including behavioral and professional conduct.

4) Identify personal employability skills and how these will be used in a workplace setting.

5) Understand the need to reflect and maximise the placement experience in future career decisions.

Assessment: Assignment 1 (100%)

Assessment Description: Students are required to attend all taught sessions and the one to one meeting (if required). The module has no credit attached. However to ensure engagement with the content a compulsory quiz will be added in session 5.Students who do not attend and have no valid reason will not be permitted to continue on a Science Industrial Placement Year programme of study.

Moderation approach to main assessment: Not applicable

Assessment Feedback: Feedback will be given once assessments are marked.

For the H&S quiz, there is an automatic pass/fail.

Failure Redemption: Successful completion of this module depends upon satisfactory attendance at, and engagement with, all sessions. Therefore there will normally be no opportunity to redeem failure. However, special provision will be made for students with extenuating or special circumstances.

Additional Notes: Delivery of teaching will be live, whilst assessments will be self-directed activities online.

BIO224 Ichthyology

Credits: 15 Session: 2023/24 January-June

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Dr EC Pope

Format: 15 lectures
3 h mackerel dissection
3 h computer-based practical
4 h aquarium visit
4 h mini-symposium

Delivery Method: In-person lectures and practicals.

Module Aims: This module follows on from BIO105 Animal Diversity to discuss the evolution, ecology, structure, functional physiology and exploitation by humans of the paraphyletic group of animals referred to as fish. A dissection will further investigate fish anatomy, emphasising the relationship between form and function, and a report using online data sources will demonstrate the wealth of data available to ichthyologists in the 21st century. Students will also give short group presentations at a virtual symposium.

Module Content: ectures:

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

Origins and evolution of fish
Body form and function
Colour, camouflage and bioluminescence
Sensory systems
Buoyancy
Trophic strategies
Respiration (gas exchange)
Osmoregulation
Reproduction and life history strategies
Intertidal fish as a case study
Fisheries

Practicals:

(These are shown as examples and are subject to change from one year to another)

Fish dissection
Use of online repository FishBase
Aquarium visit
Presentation at mini-symposium

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

LO1) Demonstrate a detailed knowledge of the evolution and taxonomic diversity of fish;
LO2) Explain the challenges of living in an aqueous environment;
LO3) Describe fish anatomy and physiology in detail, subtended by laboratory dissections;
LO4) Differentiate the reproductive strategies employed by fish;
LO5) Recognise the constraints placed upon fish by gills;
LO6) Compare teleost and elasmobranch anatomy, physiology, ecology and reproductive biology;
LO7) Access online data repositories, analyse and present downloaded data;
LO8) Discuss the basic concepts of fisheries and fishery science;
LO9) Present on an aspect of fish biology at a symposium;
L10) Conduct behavioural inventories of captive fish.

Assessment: Examination (50%)
Coursework 1 (20%)
Coursework 2 (20%)
Coursework 3 (10%)

Assessment Description: Exam (50% of grade): 30 online MCQ (33%); choice of one out of three essays (online; 67%).
Continuous assessment (50% of grade); 2 practical assignments encompassing use of FishBase (20%) and fish anatomy (20%); 1 group presentation at a symposium (10%).

Moderation approach to main assessment: Moderation by sampling of the cohort

Assessment Feedback: Practical reports and exam scripts will receive individual written feedback. Practical classes will also receive group level feedback.

Failure Redemption: Re-submission of continuous assessment and examination

Reading List: Q. Bone author., Richard H. Moore 1945- author., Biology of fishes / Quentin Bone, Richard H. Moore., New York : Taylor & Francis Group, 2008.ISBN: 9780415375627
Carl E. Bond, Biology of fishes / Carl E. Bond., Saunders College Pub, 1996.ISBN: 0030703425
D. H. Cushing, Population production and regulation in the sea : a fisheries perspective / David Cushing., Cambridge University Press, 1995.ISBN: 0521384575

Additional Notes: Delivery will be via in-person lectures and practicals, supported with the Canvas virtual learning environment.

Syllabus as stated is subject to modification due to staff availability.
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.

BIO228 Parasitology

Credits: 15 Session: 2023/24 September-January

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Dr GR Thomas

Format:
20 synchronous sessions
3 x 2 hour practicals
1 x coursework revision session
4 x exam feedback sessions
4 x 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

Asynchronous lectures, practicals, synchronous revision sessions, exam feedback sessions, drop-in sessions and blended learning (Canvas).

Module Aims: Parasitism is a highly successful strategy employed by representatives from all animal and fungal phyla, and from a large number of plants. Parasitism is a key driver of adaptation, and by extension evolution, yet is an often overlooked component in this process. This module explores the fascinating relationships between parasites and their hosts, with emphasis on parasites of medical and veterinary importance, and the importance of zoonotic diseases for human health.

Module Content: Lectures:
Introduction to parasitology
Protozoan and metazoan parasites
Ecto- and endoparasites
Public health and zoonoses
Control and management of parasitic diseases
Evolution of host-parasite systems, immune systems and evolutionary arms races

Practicals:
Diagnostic parasitology and quantitative analysis (summative practical)
Metazoan and Protozoan parasties: their identification and use of dichotomous keys (formative practical)

Intended Learning Outcomes: By the end of this module, students will:
LO1) Explain the concepts of parasitism and be conversant with the appropriate terminology
LO2) Classify parasites using a taxonomic scheme, identify target parasites by scientific name (genus, species) and
recognize given parasites by morphological features
LO3) Demonstrate familiarity with host spectra, and the importance of amplifier and reservoir hosts
LO4) Describe the main routes of parasite transmission and recognize the distribution of a parasite species
LO5) Describe routes of migration of a parasite in its target host to its principal site of infection and explain the public
health significance of parasitic zoonoses
LO6) Produce a laboratory report of professional standard, presenting data in graphical format

Assessment:
Examination 1 (50%)
Coursework 1 (25%)
Coursework 2 (25%)

Assessment Description: CW 1.
Investigative Parasitology.
This report-based coursework will challenge students to construct a parasitological investigation into the distribution, sampling methodology, and ecology of one protozoan and one metazoan parasite of medical or veterinary importance in a geographical region.

CW 2 (Practical 1).
Diagnostic parasitology and quantitative analysis
A written report and analysis of data obtained from a comparative parasitological investigation.

Practical 2 is formative.

Exam
Multiple choice questions (30%)
A timed written essay, 1 topic from a choice of 3 (70%)

Moderation approach to main assessment: Moderation by sampling of the cohort

Assessment Feedback: Formative feedback from formative practical; Feedback on summative assignments; Formal contact with tutor, general feedback via Canvas, drop in feedback sessions and feedback lecture, and comments on returned assignments.

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

Reading List: Loker, Eric S., author., Hofkin, Bruce V., author., Parasitology : a conceptual approach, CRC Press, 2023.ISBN: 9780429277405
Smyth, J. D., Wakelin, Derek., Introduction to animal parasitology / J.D. Smyth ; with a chapter on immunoparasitology by D. Wakelin., Cambridge University Press,, c1994..ISBN: 0521428114
Klaus Rohde 1932-, Marine parasitology editor, Klaus Rohde., CSIRO ; CABI, 2005.ISBN: 1283154595
Rohde, Klaus., Marine parasitology / Editor Klaus Rohde., CABI Publishing,, 2005.ISBN: 9781845930530
Schmid-Hempel, P., Evolutionary parasitology : the integrated study of infections, immunology, ecology and genetics, Oxford University Press, 2011..ISBN: 9780199229499
Albert O. Bush ... [et al.], Parasitism in perspective : diversity and ecology of animal parasites, Cambridge University Press, 2001..ISBN: 9780521664479
Cameron, Thomas W. M. (Thomas Wright Moir), 1894-, Parasites and parasitism, Methuen.
Burt, D. R. R., Burt, D.R.R., Plathyhelminthes and parasitism : an introduction to parasittology, English Universities Press, 1970.ISBN: 9780340114612

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.

BIO229 Tetrapod Evolution

Credits: 15 Session: 2023/24 January-June

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Dr WL Allen, Dr K Arbuckle, Dr C Pimiento, Dr KAR Rose

Format: 35 (consisting of 18 lectures plus 12 hrs practicals and 5 hours of drop in sessions)

Delivery Method: On campus

Module Aims: This module follows on from the introduction to vertebrates in the Level 4 Animal Diversity and Behaviour module, providing detail on form and function in vertebrates that spend all or part of their life cycle on land. Aspects of tetrapod behaviour, morphology and physiology will be considered in terms of adaptation and evolutionary constraint. Practicals will provide an introduction to the anatomy of birds and mammals by means of dissection, inference of the phylogenetic relationships between avian species, and an exploration of how beak morphology affects ecological niche in birds. Overall, students will gain an appreciation of the diversity of tetrapod types and an insight into the fundamental importance of metabolic rate in animals.

Module Content: Lectures:

METABOLIC RATE
The definition and measurement of different aspects of metabolic rate will be covered. The variation in metabolic rate according to the regulation of body temperature (i.e. homeothermy vs heterothermy) and body size, will be considered in detail.

BIRDS
Body plans; groups and lifestyle; ecology and behaviour of sea birds; flight mechanics

AMPHIBIANS & REPTILES
Taxonomy of amphibians; reproductive ecology of amphibians; taxonomy of terrestrial reptiles; turtles; evolution of reptile body plan and venom; biology of extinct reptiles (dinosaurs)

MAMMALS
Evolution and diversity of terrestrial mammals; human behavioural ecology

ACROSS TAXA
Mating systems; transitions between land and water; teeth and jaws; climate change and morphological evolution; brain evolution; sensory systems; armour

Practicals:

(These are shown as examples and are subject to change from one year to another)

Comparative anatomy of a bird and a mammal
Phylogeny of birds inferred through molecular data
Ecological drivers of bird beak shape evolution

Intended Learning Outcomes: Practicals:

By the end of the dissection practical students will be able to identify the main morphological differences between a bird and a mammal in terms of muscle mass distribution, limb morphology, feeding and digestive systems and respiratory systems.

The phylogeny practical has been designed to equip students with a working knowledge of how molecular data can be used to infer the evolutionary relationships between species. This will lead into the third beak practical which enables students to evaluate how an evolutionary perspective is necessary to understand functional morphology and species diversity.

At the end of the module the student should be able to:

LO1) Evaluate how different selective pressure have acted on vertebrate body size and morphology (assessed during assignment and examination)
LO2) Give examples of key transitions in vertebrate evolution (assessed during examination)
LO3) Describe the evolution and taxonomic diversity of vertebrate classes (assessed during examination)
LO4) Perform and critically evaluate a bird and mammal dissection (dissection assessment)
LO5) Assess the benefits and limitations of molecular data in phylogenetic inference (practical write-up)
LO6) Analyse the relationship between morphology and ecology (practical write-up)
LO7) Recognise, utilise and define key morphological terminology (assessed during assignment and examination)
LO8) Write in a clear and scientific style (all assessed work)

Assessment: Examination 1 (50%)
Coursework 1 (17%)
Coursework 2 (33%)

Assessment Description: The coursework components consist of individual practical reports.
Exam: 30 MCQ, (33.3%) Analytical Question (33.3%) and choice of one out of three essays (33.3%)

Moderation approach to main assessment: Moderation by sampling of the cohort

Assessment Feedback: Practical reports and exam scripts will receive individual written feedback. Practical classes will also receive group-level feedback.

Failure Redemption: Repeat failed components

Reading List: Pough, F. Harvey, author., Bemis, William E., author.; McGuire, Betty, author.; Janis, Christine M., author.; Bemis, William E., associated with work., Vertebrate life., Sinauer Associates, Oxford University Press, 2023 - 2023.ISBN: 9780197558621
F. Harvey Pough author., Christine M Janis (Christine Marie), 1950- author., Vertebrate life / F. Harvey Pough, Christine M. Janis ; chapter 26 "Primate Evolution and the Emergence of Humans" by Sergi Lopez-Torres, and Roman Kozlowski., New York : Oxford University Press, 2019.ISBN: 9781605356075
Dial, Kenneth Paul, Shubin, Neil, Brainerd, Elizabeth L., Great transformations in vertebrate evolution, 2015.ISBN: 022626825X
Schmidt-Nielsen, Knut,, Animal physiology : adaptation and environment / Knut Schmidt-Nielsen., Cambridge University Press,, 1997.ISBN: 9780521570985

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.

BIO230 Entomology

Credits: 15 Session: 2023/24 January-June

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Dr WE Harris

Format: This module will be delivered through in-person lectures, practical sessions, drop in assessment support, and exam preparation and feedback 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 supporting material.

Module Aims: Insects are arguably one of the most successful groups of organisms on the planet, and represent up to 90% of multicellular life. This course aims to encourage an understanding and appreciation for the adaptations and diversity of insect life, as well as emphasising the ecological and economic importance of this fascinating group. Lectures will aim to provide a broad understanding of the physiology and anatomy of insects, as well as aspects of their behaviour and ecology. Practical sessions will support the information provided in lectures, and provide opportunities to improve transferable skills. Topics covered are: Insects classification and taxonomy; insect anatomy, focussing on key adaptations of insects to life histories and features contributing to the success of this group; insect physiology, including the digestive, reproductive, nervous, circulatory and respiratory systems; insect senses and communication; the role of the cuticle and ecdysis; insect-plant interactions; insect defences, including the immune system; beneficial insects, including the role of insects as pollinators, in medicine, and in forensic science. Lectures are complemented by two practical sessions that include a demonstration of the insect orders to support lecture material, including examples of key groups and an introduction to identification; and further development of taxonomic skills to enhance field study..

Module Content: Direct teaching (approximate time allocation in brackets)

Introduction to insects (1 hour)
Anatomy - head, mouthparts and antennae (1 hour)
Anatomy - thorax, legs and wings (2 hour)
Anatomy - abdomen, reproductive, respiratory, circulatory and digestive systems (2 hours)
Senses and communication (2 hours)
Cuticle and ecdysis (2 hours)
Insect-plant interactions (1 hour)
Insect defences (2 hours)
Beneficial insects (1 hour)
Insect classification - the insect orders (2 hours)
Surveying and identifying insects in the field (2 hours)
Revision (1 hour)

Practicals

1. Demonstration practical supporting lecture on insects classification.
2. Insect survey techniques and taxonomy

E-learning

Additional resources provided on Canvas will include relevant articles, useful websites, and interactive quizzes
to support revision and learning

Intended Learning Outcomes: At the end of this module students will:

LO1) Distinguish the structural and functional modifications which contribute to the success of insects
LO2) Classify and identify insects, using keys and guides, to order and family; recognise key order features
LO3) Compare insect anatomy and physiology, and consider functional roles of adaptations
LO4) Create teaching resources, in small groups, on a specific aspect of insect anatomy and physiology and demonstrate peer marking
LO5) Evaluate how insects perceive and interact with other organisms and their environment
LO6) Integrate the role of hormones in controlling metamorphosis and growth, and mechanisms for survival
LO7) Relate principles of visual and chemical defences to insect examples; connect immune function to knowledge of anatomy
LO8) Consider the role of insects and ecosystem service providers and their importance in maintaining ecosystem functioning
LO9) Design a hypothesis-based modelling experiment and present as a professional scientific poster

Assessment: Examination 1 (50%)
Coursework 1 (20%)
Coursework 2 (30%)

Assessment Description: Coursework 1:Insect system teaching resources - group work (20%)
Coursework 2: Insect conservation report (30%)

Moderation approach to main assessment: Not applicable

Assessment Feedback: Group feedback provided via Canvas following discussions and presentations.

Personal feedback provided on coursework submitted, as well as general feedback provided via Canvas for each coursework component.

Direct general feedback during lectures and practical sessions.

Formal feedback session to discuss examination results.

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

Reading List: P. J. Gullan author., P. S. Cranston author.; Karina H. McInnes illustrator., The insects : an outline of entomology / P.J. Gullan and P.S. Cranston ; with illustrations by Karina H. McInnes., Chichester : John Wiley & Sons, Ltd, 2014.ISBN: 9781118846155
Claudia Voelckel editor.; Georg Jander editor.; Gustavo Bonaventure contributor., Insect-plant interactions / edited by Claudia Voelckel, Georg Jander ; contributors Gustavo Bonaventure [and twenty six others]., Chichester, England : Wiley Blackwell, 2014.ISBN: 1118829786
Schowalter, Timothy Duane, 1952- author., Insect ecology : an ecosystem approach, Academic Press, 2022.ISBN: 9780323856744
Royal Entomological Society of London., Ecological entomology, Blackwell Science, 1976.ISBN: 13652311
Edward A Steinhaus (Edward Arthur), 1914-1969; Entomological Society of America., Annual review of entomology., Annual Reviews, 1956.ISBN: 00664170
David B. Rivers 1966-, Gregory A Dahlem, The science of forensic entomology / David B. Rivers, Gregory A. Dahlem., Chichester, England : Wiley Blackwell, 2014.ISBN: 1118403037
Rolf G. Beutel, Insect morphology and phylogeny : a textbook for students of entomology / Rolf G. Beutel [and three others]., Berlin : Walter de Gruyter GmbH & Co., 2014.ISBN: 3110264048
Brian Morris 1936-, Insects and human life / Brian Morris., Berg, 2004.ISBN: 9781845200756
L. M. Schoonhoven, J. J. A. van Loon; Marcel Dicke, Insect-plant biology Louis M. Schoonhoven, Joop J.A. van Loon, Marcel Dicke., Oxford University Press, 2005.ISBN: 0191545821
Nicholas Marquez-Grant 1976- editor.; Julie Roberts (Julie J.), editor., Forensic ecology handbook : from crime scene to court / edited by Nicholas Marquez-Grant and Julie Roberts., Chichester, West Sussex, England : Wiley-Blackwell, 2012.ISBN: 1118374010
Jay A. Siegel author., Kathy Mirakovits author., Forensic science : the basics / Jay A. Siegel, Kathy Mirakovits., Boca Raton, Florida ; London, England ; New York : CRC Press, 2010.ISBN: 0429252323

Additional Notes: Delivery of both teaching and assessment will be in perso.

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.

BIO231 Year 2 Biological Sciences Literature Review

Credits: 15 Session: 2023/24 January-June

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Dr GR Thomas

Format: 2 Lectures
1 library workshop
1 workshop tutorial
Correspondence with marker
1 Feedback tutorial

Delivery Method: Composite of asynchronous lectures, synchronus sessions, and tutorial workshops. Independent study

Module Aims: This module is designed to develop the core literacy skills of undergraduate students at Level 2 in Biosciences. It
consists of the production of a detailed, 3000 word critical review of a recent topic of scientific interest that is
relevant to the students degree scheme (biological, zoological or marine) and an accompanying scientific poster. Students are required to independently undertake a thorough literature search utilising an appropriate scientific search engine. They must then collate all of the relevant information into a comprehensive review summarising the key aspects of the topic whilst also validating the reliability of the sources of information. Furthermore, students will be required to prepare a poster summarising the key background information and findings of their review. All reviews and posters will be submitted electronically via TURNITIN to ensure compliance with the Universities policies on plagiarism.

Module Content: Lectures and tutorials will encompass:

Lecture 1 - Writing a scientific review and utilising search engines
Lecture 2 - Poster preparation and presentation
Workshop – Database searches and referencing
Tutorial 1 - Group discussion of chosen topics and further guidance
Tutorial 2 - Feedback on first draft from allocated marker
Tutorial 3 - Feedback review and poster

Intended Learning Outcomes: Students will be able to:

LO1) Acquire and recall knowledge of species and biological diversity
LO2) Principles of biology and their applications encompassing the interactions and relationships of organisms with their environment, from single celled organisms to ecosystems and the methods used for their investigation.
LO3) Apply knowledge of the principles and concepts of biological sciences to problem solving in the real world and in artificial systems.
LO4) Design, plan and create an independent literature-based research project and analyse its results critically, interpreting them in the context of current biological knowledge
LO5) To critically assess, evaluate and synthesise information from published scientific sources and use it to construct reasoned arguments and testable hypotheses.
LO6) 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
LO7) Conduct an effective literature search by describing, summarising, evaluating and clarifying scientific information and identify and articulate the relationships between the literature
LO8) Format, reference and structure a scientific review
LO9) Summarise information through the production of a scientific poster
LO10) Design and manage a programme of work to investigate a given problem
LO11) Accept responsibility for and manage their own learning, making use of appropriate texts, journals, electronic resources and other learning resources.

Assessment: Report (75%)
Presentation (25%)

Assessment Description: 3000 word literature review
Poster presentation

Moderation approach to main assessment: Universal Double Blind Marking of the whole cohort
Assessment Feedback: Individual written formative feedback on a draft Written comments and oral feedback on final submission Individual written feedback on poster from tutor and peer review
Failure Redemption: Re-submission of coursework
Reading List: Johnson, Stuart, 1973- author., Scott, Jon, author., Study and communication skills for the biosciences, Oxford University Press, 2019.ISBN: 9780198791461 Boyle, J. and Ramsay, S., Ramsay, Scott,, Palgrave Study Skills: Writing for Science Students, Palgrave, 2017.ISBN: 9781137571519 Jennifer Boyle author., Scott Ramsay author., Writing for science students / Jennifer Boyle and Scott Ramsay., London : Palgrave in the UK is an imprint of Macmillan Publishers Limited, 2017.ISBN: 9781137571519
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.

BIO231C Adolygiad Llenyddiaeth Bl 2

Credits: 15 Session: 2023/24 January-June

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Dr GR Thomas

Format:
2 darlith
1 gweithdy llyfrgell
1 gweithdy yn ystod tiwtorialau
Trafodaeth gyda'r marciwr
1 tiwtorial adborth

2 Lectures
1 library workshop
1 workshop tutorials
Correspondence with marker
1 Feedback tutorial

Delivery Method: Cyfansawdd o ddarlithoedd asyncronig, sesiynau cydamserol, a gweithdai yn ystod tiwtorialau.
Astudiaeth annibynnol.

Composite of asynchronous lectures, synchronus sessions, and tutorial workshops.
Independent study

Module Aims: Mae'r modiwl hwn wedi'i gynllunio i ddatblygu sgiliau llythrennedd craidd myfyrwyr israddedig Lefel 2 y
Biowyddorau. Mae'n cynnwys cynhyrchu poster ac adolygiad manwl a beirniadol o'r llenyddiaeth ddiweddar ar bwnc
sy'n berthnasol i bwnc gradd y myfyriwr (swoleg, bioleg, bioleg y mor). Rhaid i'r adolygiad fod yn 3000 o eiriau o
hyd. Mae'n ofynnol i fyfyrwyr gynnal chwiliad llenyddiaeth drylwyr annibynnol gan ddefnyddio cronfa gwyddonol
priodol neu peiriant chwilio. Rhaid i'r myfyriwr gasglu'r holl wybodaeth berthnasol mewn adolygiad cynhwysfawr sy'n
crynhoi'r agweddau allweddol o'r pwnc tra hefyd yn dilysu dibynadwyedd y ffynonellau gwybodaeth. Ar ben hynny,
bydd myfyrwyr yn paratoi poster yn crynhoi'r wybodaeth hyn yn gryno, ynghyd a chefndir allweddol a chanfyddiadau
eu hadolygiad. Bydd adolygiadau a phosteri yn cael eu cyflwyno yn electronig trwy Turnitin i sicrhau cydymffurfiaeth â
pholisïau y Brifysgol ar llên-ladrad.

This module is designed to develop the core literacy skills of undergraduate students at Level 2 in Biosciences.
It consists of the production of a detailed, 3000 word critical review of a recent topic of scientific interest that is relevant to the students degree scheme (biological, zoological or marine) and an accompanying scientific poster.
Students are required to independently undertake a thorough literature search utilising an appropriate scientific
search engine. They must then collate all of the relevant information into a comprehensive review summarising the
key aspects of the topic whilst also validating the reliability of the sources of information. Furthermore, students will
be required to prepare a poster summarising the key background information and findings of their review. All
reviews and posters will be submitted electronically via TURNITIN to ensure compliance with the Universities policies on
plagiarism.

Module Content: Bydd darlithoedd a tiwtorialau yn cwmpasu:
Darlith 1 - Ysgrifennu adolygiad gwyddonol a defnyddio peiriannau chwilio
Darlith 2 - Paratoi a cyflwyno posteri
Gweithdy 1 - archwilio cronfeydd data a ffynhonellu effeithiol
Tiwtorial 1 - Trafodaeth grp o bynciau a ddewiswyd ac arweiniad pellach
Tiwtorial 2 - Adborth ar y drafft cyntaf gan eich marciwr
Tiwtorial 3 - Adolygiad o'r adborth a phoster

Lectures and tutorials will encompass:
Lecture 1 - Writing a scientific review and utilising search engines
Lecture 2 - Poster preparation and presentation
Workshop – Database searches and referencing
Tutorial 1 - Group discussion of chosen topics and further guidance
Tutorial 2 - Feedback on first draft from allocated marker
Tutorial 3 - Feedback review and poster

Intended Learning Outcomes: Mi fydd myfyrwyr yn medru:

LO1) Gaffael a dwyn i gof gwybodaeth o rywogaethau ac amrywiaeth biolegol
LO2) Egwyddorion bioleg a sut maent yn cwmpasu'r rhyngweithio a pherthnasoedd o organebau â'u hamgylchedd, o organebau un gellog i ecosystemau, a'r dulliau a ddefnyddir ar gyfer eu hymchwilio.
LO3) Defnyddio deallusrwydd o egwyddorion a chysyniadau y gwyddorau biolegol er datrys problemau yn y byd go iawn ac
mewn systemau artiffisial.
LO4) Dylunio, cynllunio a chreu prosiect ymchwil annibynnol ar sail llenyddiaeth, gan ddadansoddi y canlyniadau yn feirniadol,
a dehongli hyn yng nghyd-destun gwybodaeth fiolegol.
LO5) Asesu yn feirniadol, gwerthuso a chyfuno gwybodaeth o ffynonellau gwyddonol cyhoeddedig ac yn ei ddefnyddio i
llunio dadleuon rhesymegol a damcaniaethau sy'n cael eu profi.
LO6) Adnabod cysylltiadau ac adnabod themâu rhwng yr ystod o bynciau gwyddonol, cyn greu ystyr o'r wybodaeth ar lafar, yn ysgrifenedig, a rhifiadol trwy ddehongli a chrynhoi.
LO7) Cynnal chwiliad llenyddiaeth effeithiol drwy ddisgrifio, crynhoi, gwerthuso ac egluro gwybodaeth a nodi a mynegi perthynasau.
LO8) Fformatio, cyfeirio a strwythuro adolygiad gwyddonol
LO9) Crynhoi gwybodaeth drwy gynhyrchu poster gwyddonol
LO10) Dylunio a rheoli rhaglen o waith i ymchwilio i broblem benodol
LO11) Derbyn cyfrifoldeb am, a rheoli eu dysgu eu hunain, gan wneud defnydd o destunau priodol, cyfnodolion, adnoddau electronig ac adnoddau dysgu eraill

Students will be able to:

LO1) Acquire and recall knowledge of species and biological diversity
LO2) Principles of biology and their applications encompassing the interactions and relationships of organisms with
their environment, from single celled organisms to ecosystems and the methods used for their investigation.
LO3) Apply knowledge of the principles and concepts of biological sciences to problem solving in the real world and
in artificial systems.
LO4) Design, plan and create an independent literature-based research project and analyse its results critically,
interpreting them in the context of current biological knowledge
LO5) To critically assess, evaluate and synthesise information from published scientific sources and use it to
construct reasoned arguments and testable hypotheses.
LO6) 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
LO7) Conduct an effective literature search by describing, summarising, evaluating and clarifying scientific information and identify and articulate the relationships between the literature
LO8) Format, reference and structure a scientific review
LO9) Summarise information through the production of a scientific poster
LO10) Design and manage a programme of work to investigate a given problem
LO11) Accept responsibility for and manage their own learning, making use of appropriate texts, journals, electronic
resources and other learning resources.

Assessment: Report (75%)
Presentation (25%)

Assessment Description: Adolygiad llenyddiaeth 3000 o eiriau
Cyflwyniad poster

3000 word literature review
Poster presentation

Moderation approach to main assessment: Universal Double Blind Marking of the whole cohort

Assessment Feedback: Adborth unigol wedi'i ysgrifennu ar ddrafft
Adborth ysgrifenedig ac ar lafar ar y drafft terfynnol
Adborth unigol ar y poster wrth eich tiwtor

Individual written formative feedback on a draft
Written comments and oral feedback on final submission
Individual written feedback on poster from tutor

Failure Redemption: Ail-gyflwyno gwaith cwrs

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.

Modiwl cyfrwng Cymraeg yw hon. Nid yw ar gael i fyfyrwyr sy'n ymweld a'r adran, ag eithrio'r rhai sydd yn rhan o
raglen cyfnewid yr adran.

This is a Welsh language module. Not available to visiting or exchange students with exception of those within the
School’s existing exchange programmes

BIO232 Plant Ecology

Credits: 15 Session: 2023/24 January-June

Pre-requisite Modules: BIO111

Co-requisite Modules:

Lecturer(s): Dr PJ Neyland, Dr AP Devine, Prof CA Froyd

Format: In person lectures (~16 hours), computer practicals (2 hours), field trips (8 hours) and drop-in sessions. Contact Hours will be delivered through a blend of live activities on-campus.

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. In person lectures (~16 hours), computer practicals (2 hours), field trips (8 hours) and drop-in sessions. Contact Hours will be delivered through a blend of live activities on-campus. Students may also have the opportunity to engage with online versions of sessions delivered on-campus

Composite, lectures and practicals

Module Aims: This module provides a holistic approach to plant ecology, including both classical ecological theory and practical surveying techniques. Students will become familiar with six major themes; plant formations and biomes, synecology, autecology, plant geography, paleoecology and modern plant ecology. Students will also be trained in plant taxonomy, field surveying techniques, data analysis and report writing that complement a future career in ecology, conservation or consultancy

Module Content:

This module will be taught holistically, adopting both a classical approach, which introduces students to plant ecological theory, together with a practical approach, which will impart students with transferable skills that are necessary for a career in ecology. The syllabus will be split into six major themes:

1. Plant formations and global vegetation patterns
 - Biomes, climate and plant distribution, productivity and reproduction, UK habitats
2. Synecological studies
 - Succession (sand dune and salt marsh), Clements and Gleason, plant communites and phytosociology, Braun Blanquet, National Vegetation Classification, Phase 2 community surveys, bryophyte communities
3. Autecological studies
 - Clapham and the Flora of the British Isles, comparative plant ecology; a functional approach (Grime), plant ecology data bases (e.g. Fitter), Ellenberg indicator values, Biological Flora of the British Isles, autecology of individual species
4. Plant Geography
 - Soils, distribution maps, distribution patterns (endemic versus disjunct), biogeographical elements
5. Palaeoecology
- Long-term vegetation dynamics of the continents, geologic timescales and ice ages, Holocene (last 11,000 years) history of the British flora, palaeoecological methodologies (palynology, chronology, sediments, proxies), tropical forest stability, human impact, natural disturbance, applications of long-term ecological information to conservation
6. Modern themes in plant ecology
- Invasive species, identification, legislation and mangement

Practicals

- Field sampling techniques and quantitative vegetation data collection
- Taxonomy and identification - excursion to National Botanic Garden Wales
- PC data analysis workshop

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

LO1) Recognise plant formations and biomes
LO2) Classify important UK habitats
LO3) Compare and contrast synecology (plant communities) and autecology (single species)
LO4) Describe plant biogeography and distribution patterns
LO5) Describe history of the British flora and paleoecology
LO6) Undertake ecological surveys; interpret and analyse ecological data and produce a professional report
LO7) Outline modern plant ecology: identification, legislation and management of invasive species

Assessment:	Examination 1 (50%) Coursework 1 (20%) Coursework 2 (30%)

Assessment Description: 50% examination (2 hours; 30 MCQ plus one essay question)
50% coursework including:
CW1 Presentation/posters/scrapbook - plant identification, distribution and conservation (40% of coursework mark)
CW2 Woodland plant communities - ecological report, data analysis and interpretation data presentation (60% of coursework mark)

Moderation approach to main assessment: Moderation by sampling of the cohort

Assessment Feedback: Formative written feedback on coursework.
Contact with lecturer as required.
Summative mark for exams.

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

Reading List: O. W. Archibold author., Ecology of world vegetation / O.W. Archibold., London : Chapman & Hall, 1995.ISBN: 9780412443008
Gurevitch, Jessica, author., Scheiner, Samuel M., 1956- author.; Fox, Gordon A., 1952- author., The ecology of plants, Sinauer Associates, is an imprint of Oxford University Press, 2021.ISBN: 9781605358291
Crawley, Michael J., Plant ecology / edited by Michael J. Crawley., Blackwell Scientific,, 1997.ISBN: 0632036397
J. Philip Grime (John Philip), J Hodgson (John), 1937-; Roderick Hunt 1945-, Comparative plant ecology : a functional approach to common British species / J.P. Grime, J.G. Hodgson and R. Hunt., Castlepoint Press, 2007.ISBN: 9781897604304
Neil Roberts 1953-, Holocene : an environmental history / Neil Roberts., Chichester, England : Wiley Blackwell, 2014.ISBN: 9781405155212
K. J. Willis author., J. C. McElwain author., The evolution of plants / K.J. Willis, J.C. McElwain., Oxford : Oxford University Press, 2014.ISBN: 9780199292233
J. S. Rodwell editor.; C. D. Pigott contributor., British plant communities. Volume 1, Woodlands and scrub / J. S. Rodwell, editor ; C. D. Pigott [and nine others], contributor ; for the Nature Conservancy Council., Cambridge : Cambridge University Press, 1991.ISBN: 1107099560
J. S Rodwell; C.D Pigott, British plant communities. Vol.1, Woodlands and scrub ; J. S. Rodwell (editor) ; C.D.Pigott ... [et al.] for the Nature Conservancy Council., Cambridge University Press, 1991.
J. S Rodwell; Joint Nature Conservation Committee (Great Britain), British plant communities. Vol. 2, Mires and heaths / J.S. Rodwell (editor) ; C.D. Pigott [and others] for the UK Joint Nature Conservation Committee., Cambridge University Press, 1998.ISBN: 9780521627207
Rodwell, J. S., Pigott, C. D., British plant communities. Vol.2, Mires and heaths ; J.S. Rodwell (editor) ; C.D. Pigott ... [et al.] for the UK Joint Nature Conservation Committee., Cambridge University Press,, 1991.ISBN: 0521391652
Pigott, C.D., Rodwell, J. S., British plant communities. Vol.3, Grasslands and montane communities ; edited by J S Rodwell., Cambridge University Press,, c1992..
Rodwell, J. S., Pigott, C. D., British plant communities. Vol.4, Aquatic communities, swamps and tall-herb fens ; J.S. Rodwell (editor), C.D. Pigott et al for the U.K. Joint Nature Conservation Committee., Cambridge University Press,, 1995.ISBN: 0521391687
J. S. Rodwell editor.; C. D. Pigott contributor.; D. A. Ratcliffe contributor.; A. J. C. Malloch contributor.; H. J. B. Birks contributor.; M. C. F. Proctor contributor.; D. W. Shimwell contributor.; J. P. Huntley contributor.; E. Radford contributor.; M. J. Wigginton contributor.; P. Wilkins contributor.; Joint Nature Conservation Committee (Great Britain), British plant communities. Volume 5, Maritime communities and vegetation of open habitats / J.S. Rodwell (editor) ; C.D. Pigott, D.A. Ratcliffe, A.J.C. Malloch, H.J.B. Birks, M.C.F. Proctor, D.W. Shimwell, J.P. Huntley, E. Radford, M.J. Wiggninton, P. Wilkins for the U.K. Joint Nature Conservation Committee., Cambridge : Cambridge University Press, 2000.ISBN: 9780521391672

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.

BIO234 Animal Conservation and Welfare

Credits: 15 Session: 2023/24 September-January

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Dr HJ Nichols, Dr K Arbuckle, Dr I Fuertbauer

Format: 16 hrs lectures, 4hrs workshops, full day field trip, 3hrs coursework support

Delivery Method: In person with online support

Module Aims: This module assesses how animal behaviour is often the most significant cause of species declines and how understanding patterns of behaviour can assist in developing effective conservation and management strategies for species on the brink of extinction. Students will be introduced to the concept of conservation biology and the vast array of human-induced activities that currently threaten biological diversity on a global scale. There is a focus on the five main activities of conversational concern; fragmentation, habitat degradation, over-exploitation, invasive species and climate change. Examples will be provided from specific taxa affected. The shortfalls of in situ and ex situ conservation are introduced and examples are provided of how behavioural studies and knowledge of animal behaviour can, and have been used within conservation.

The role of understanding behaviour in domestic animal welfare is also introduced. Here students learn about the history and current UK policy on the use of farm and laboratory animals. Following that an insight is provided into how our domesticated animals perceive the captive environment and have developed behavioural mechanisms to cope with incarceration that can also be assessed to ensure sufficient welfare is provided.

Module Content: Lectures:

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

An introduction to Conservation biology
Habitat loss
Habitat fragmentation and degradation
In situ conservation
Ex situ conservation
Overexploitation
Climate change
Invasive species
Introduction to animal welfare
Farm animal behaviour and welfare
Animals in scientific procedures
Welfare in lab animals

Practicals;
Behaviour and welfare assessment in a zoo

Workshops:
Human behaviour in conservation
Designing and evaluating husbandry regimes

Intended Learning Outcomes: During this module, students will:

LO1) Describe current topics in Conservation Biology including the current loss of biodiversity and contributory anthropogenic factors and how knowledge of animals behaviour in critical when conserving a species
LO2) Evaluate Animal Welfare practices in the UK with specific reference to farm and laboratory animals
LO3) Explain legislation that governs conservation and welfare
LO4) Critically assess, analyse and interpret scientific information from a range of sources and in a range of formats
LO5) Assess the husbandfy regime of animals in a zoological establishment

Assessment: Coursework 1 (20%)
Coursework 2 (30%)
Examination 1 (50%)

Assessment Description: Coursework 1: Five main threats 5 minute recorded presentation
Coursework 2: Evidence based husbandry report
Examination: MCQ 30 questions, choice of one essay question from three options

Moderation approach to main assessment: Moderation by sampling of the cohort

Assessment Feedback: Individual (or group) feedback for all coursework.

Failure Redemption: Re-submission of failed components

Reading List: Berger-Tal, Oded; Saltz, David, Conservation behavior : applying behavioral ecology to wildlife conservation and management / edited by Oded Berger-Tal, Ben Gurion University of the Negev, Israel and David Saltz, Ben Gurion University of the Negev, Israel., 2016.ISBN: 9781107690417
Broom, Donald M., Sentience and animal welfare / Donald M. Broom., 2014.ISBN: 9781780644042
Broom, Donald M., author., Broom and Fraser's domestic animal behaviour and welfare, CAB International, 2021 - 2021.ISBN: 9781789249835
Gosling, L. Morris,, Sutherland, William J., Behaviour and conservation / edited by L. Morris Gosling and William J. Sutherland., Cambridge University Press,, 2000.ISBN: 9780521665391
T. M Caro (Timothy M.), editor., Behavioral ecology and conservation biology / edited by Tim Caro., New York : Oxford University Press, 1998.ISBN: 9780195104905
Navjot S. Sodhi, Navjot S Sodhi; Paul R Ehrlich, Conservation biology for all edited by Navjot S. Sodhi and Paul R. Ehrlich., Oxford University Press, 2010.ISBN: 9786612730689
Cardinale, Bradley J. (Bradley Joseph) author., Primack, Richard B., 1950- author.; Murdoch, James D., author., Conservation biology, Oxford University Press, 2020 - 2020.ISBN: 9781605357140

Additional Notes: 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.

BIO235 Molecular Ecology

Credits: 15 Session: 2023/24 September-January

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Dr Micheal Gwilliam

Format: 17 - Lectures (including 1 revision and 1 feedback)
3 -1 x 3 hour lab practical
3 - 1 x 3 PC pracs
6- 2 x 3 hour workshop
6 -2 x 3 hour drop-in sessions

Delivery Method: Composite lectures, practicals, workshops and seminars

Module Aims: Molecular ecology is an emerging field that takes advantage of the latest advances in molecular genetics to answer
a varied range of theoretical and practical questions in ecology including conservation genetics, behavioural
ecology, phylogeography, adaptation, hybridization and speciation. Through a combination of theoretical lectures,
laboratory practicals and class discussions we will consider the application of a range of molecular and statistical
tools to problems such as species conservation, biological invasions, wildlife forensics or fisheries. Lectures include a basic introduction to the field of Molecular Ecology and its connections to Conservation Biology and Population Genetics. This will be followed by lectures on population diversity focused on: molecular markers and genetic variation in natural populations, phylogeography and barcoding, population structuring and differentiation, mating systems, behavioural ecology and inbreeding. A more applied part of the programme will include lectures on microbial ecology, forensic science and conservation applications. Two practical lectures will cover the use of barcoding for species identification, including DNA extraction, amplification and sequencing (laboratory based) and the identification of there sequences using databases such as Genbank (computer based).

Module Content: Lectures will cover the following general topics:
•Overview of Molecular ecology: history and molecular applications for ecologists
•Basic molecular markers and techniques applied for ecological studies
•Basic population genetics
•Applications:
Behavioural ecology
Conservation genetics
Population ecology
Phylogeography and landscape genetics
Identification of species, individuals and sex

•MCQ quiz and review of past exam questions

Assignments
-Problem-solving exercise and/or MCQ quiz at final lecture and practical

Practicals
-Combined laboratory and computer based practical: use of molecular methods for species identification
Workshop
-Analysis of current literature on Mol Ecol to discuss methods, interpretation of results and writing up

Intended Learning Outcomes: At the end of the module students will have been introduced to molecular techniques used in ecological research.
The principles of population genetics will be introduced, and published case studies will be explored.

By the end of the module, the student is expected to be able to:

LO1) Appreciate the application of molecular tools in ecological and conservation studies
LO2) Recognise basic molecular techniques commonly used in such studies and their particular application
LO3) Demonstrate a knowledge of the basic principles of population genetics and how it is applied to ecological and conservation research
LO4) Locate ecological/conservation research papers (journal articles) reporting the use of molecular methods in inter- and intraspecific studies
LO5) Recognise the structure and language of a scientific paper and produce a basic paper with the results of their laboratory practical work
LO6) Calculate population genetic diversity and recognise the context for its application
LO7) Interpret the results from basic analyses of diversity and relate them to managing problems
LO8) Carry out basic molecular lab analyses for species identification using DNA barcoding

Assessment: Examination (50%)
Coursework 1 (25%)
Coursework 2 (25%)

Assessment Description: Examination: 30 MCQ, short essay and analytical question

Coursework 1: MCQ based on course topics and lab practical

Coursework 2: Analysis and writing of results of lab and computer practical in the form of a scientific report/paper

Moderation approach to main assessment: Moderation by sampling of the cohort

Assessment Feedback: Written feedback for coursework and exams
Verbal feedback for coursework and for exams if needed

Failure Redemption: Re-submission of practical reports or exam

Reading List: Freeland, Joanna, author., Molecular ecology, Wiley Blackwell, 2020.ISBN: 9781119426158
Freeland, Joanna, author., Kirk, Heather, 1980- author.; Petersen, Stephen, author., Molecular ecology / Joanna R. Freeland and Heather Kirk ; Stephen Petersen., John Wiley & Sons Ltd, 2011 - 2011.ISBN: 9780470748336
Rowe, Graham, author., Sweet, Michael (Michael John), author.; Beebee, Trevor J. C. (Trevor John Clark), author., An introduction to molecular ecology, Oxford University Press, 2017.ISBN: 9780198716990
Frankham, Richard,, Ballou, J. D., Briscoe, David A., Introduction to conservation genetics / Richard Frankham, Jonathan D. Ballou, David A. Briscoe ; line drawings by Karina H. McInnes., Cambridge University Press,, 2010.ISBN: 9780521702713

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.

BIO236 Cells and Immunity

Credits: 15 Session: 2023/24 January-June

Pre-requisite Modules: BIO104

Co-requisite Modules:

Lecturer(s): Prof AF Rowley, Dr CE Davies

Format: Lectures (20); Practicals (5x3 hr); revision (1); feedback (1)

Delivery Method: Composite, lectures and practicals

Module Aims: This module consists of the following lectures and practicals:

Lecture Topics:
1. Advances in microscopy (2)
2. Cell, tissue and organ culture - bioengineering and stem cells (3)
3. Immunology (15)

Practicals:
1. Live cells – methods of observation and counting (1)
2. Human haematology (2)
3. Immunodiffusion (2)

Module Content: This module consists of the following lectures and practicals:

Lecture Topics:
1. Advances in microscopy (2)
2. Cell, tissue and organ culture - bioengineering and stem cells (3)
3. Immunology (15)

Practicals:
1. Poster presentation (1)
2. Lysoplate analysis of lysozyme (2)
3. Spectrophotometric analysis of changes in lysozyme (2)

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

LO1) Discuss the recent developments in tissue and organ culture, with particular reference to biomedicine
LO2) Recognise the differences and importance of innate and adaptive immunity
LO3) Consider the variety of approaches to microscopy and the recent technological developments
LO4) Perform a standard cell count using haemocytometry, and an immunodiffusion assay, identifying the limitations of these approaches
LO5) Interpret and analyse data related to human haematology
LO6) Produce a detailed laboratory report to a professional standard, integrating examples from the existing literature

Assessment: Coursework 1 (15%)
Coursework 2 (35%)
Examination 1 (50%)

Assessment Description: Examination (2 hr)

Continuous assessment (one report of ca. 2000 words showing evidence of data analysis, interpretation and use of primary literature)

Moderation approach to main assessment: Moderation by sampling of the cohort

Assessment Feedback: Examination feedback session (1 group session)

Practical report feedback session (1 group session)

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

Reading List: Male, David K., 1954- author., Immunology : an illustrated outline, CRC Press, 2021.ISBN: 9780367684648
Peter Wood (Peter John), 1952- author., Understanding immunology / Peter Wood., Harlow : Pearson Education Limited, 2011.ISBN: 9780273730705
Murphy, Kenneth (Kenneth M.), author., Weaver, Casey, author.; Berg, Leslie, author.; Barton, Gregory, contributor.; Janeway, Charles A., Janeway's Immunobiology., W.W. Norton & Company, 2022 - 2022.ISBN: 9780393884913
Kenneth Murphy (Kenneth M.) author., Casey Weaver author., Janeway's immunobiology / Kenneth Murphy, Casey Weaver ; with contributions by Allan Mowat, Leslie Berg, David Chaplin ; with acknowledgment to Charles A. Janeway Jr., Paul Travers, Mark Walport., New York, NY : Garland Science/Taylor & Francis Group, LLC, 2017.ISBN: 9780815345510
Karp, Gerald, author., Iwasa, Janet, author.; Marshall, Wallace, author., Cell and molecular biology, Wiley, 2021.ISBN: 9781119834908
Gerald Karp author., Janet Iwasa author.; Wallace Marshall author., Cell biology / Janet Iwasa, Wallace Marshall., Hoboken, NJ : John Wiley, 2016.ISBN: 9781119454175
Murphy, Kenneth (Kenneth M.), author., Weaver, Casey, author.; Berg, Leslie, author.; Barton, Gregory, contributor.; Janeway, Charles A., Janeway's immunobiology, W.W. Norton and Company, 2022.ISBN: 9780393884913
Alberts, Bruce author., Hopkin, Karen, author.; Johnson, Alexander (Alexander D.), author.; Morgan, David, 1958- author.; Raff, Martin C., author.; Roberts, K. (Keith), author.; Walter, Peter (Professor) author., Essential cell biology, W. W. Norton and Company, Inc., 2019.ISBN: 9780393680393
Alberts, Bruce, author., Heald, Rebecca, 1963- author.; Johnson, Alexander (Alexander D.), author., Molecular biology of the cell, W. W. Norton & Company, 2022.ISBN: 9780393884852

Additional Notes: 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.

BIO237 Marine Invertebrates

Credits: 15 Session: 2023/24 September-January

Pre-requisite Modules: BIO114

Co-requisite Modules:

Lecturer(s): Dr EC Pope

Format: 15 lectures; 2 practicals; 1 fieldtrip. Contact Hours will be delivered through in-person activities on-campus.

Delivery Method: Delivery of both teaching and assessment will be via in-person lectures and laboratory practicals, supported using the Canvas virtual learning environment.

Module Aims: This module introduces students to the vast diversity of marine invertebrate and the fundamental roles they play in marine ecology. Students will receive 15 lectures and two laboratory practicals covering the general themes of: marine invertebrate taxonomy and developmental biology; form, function and behaviour; comparative physiology; reproductive strategies and biogeography; and ecological roles. Students will also visit an outstanding intertidal environment to see the fundamental importance of marine invertebrates in this ecosystem. Students will be examined on their understanding of the lecture material, recommended reading and practical techniques.

Module Content: Lectures:

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

The challenges of living in a marine environment
The intertidal zone
Gelatinous marine animals
Polychaetes
Crustaceans
Molluscs
Echinoderms
Reproductive strategies
Larval dispersal and biogeography
Developmental biology
Nervous systems
Locomotory strategies
Benthic and pelagic ecology
Biofouling
Sentience

Practicals:

(These are shown as examples and are subject to change from one year to another)

Larval generation
Comparative dissection
Field trip to demonstrate the abundance of marine invertebrates intertidally.

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

LO1) Demonstrate an understanding of the evolution and taxonomic diversity of marine invertebrates (assessed during examination)
LO2) Show a thorough knowledge of the biology and ecology of key groups of marine invertebrates (assessed during examination)
LO3) Appreciate the comparative anatomy and physiology of key marine invertebrate phyla (assessed during examination and practicals)
LO4) Discuss marine reproductive strategies and their importance for the biogeography of species (assessed during examination and practicals)
LO5) Perform standard aquaculture procedures involved in the production of invertebrate larvae (from practicals)
LO6) Discuss comparative mollusc anatomy, subtended by laboratory dissections (assessed during examination and practicals)
LO7) Produce detailed laboratory reports, including data analysis and use of other research to strengthen arguments (from practical report)

Assessment: Examination 1 (50%)
Coursework 1 (25%)
Coursework 2 (25%)

Assessment Description: Theory exam (30 multiple-choice questions: 33%; one essay choice from three: 67%).
Continuous assessment; 2 practical assignments encompassing comparative anatomy and reproduction and feeding.

Moderation approach to main assessment: Moderation by sampling of the cohort

Assessment Feedback: Individual written formal feedback on assignments
Lecture giving overall class feedback on assignment

Failure Redemption: Re-submission of continuous assessment and examination

Reading List: Levinton, Jeffrey S., author., Marine biology : function, biodiversity, ecology, Oxford University Press, 2022.ISBN: 9780197543504
J. Moore (Janet) author., Raith Overhill illustrator., An introduction to the invertebrates / Janet Moore ; illustrated by Raith Overhill., Cambridge : Cambridge University Press, 2006.ISBN: 9780521857369

Additional Notes: Delivery of both teaching and assessment will be via in-person lectures and practicals, supported using the Canvas virtual learning environment.

Syllabus as stated is subject to modification due to staff availability. 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.

BIO239 Ecological Microbiology and the Cycles of Life

Credits: 15 Session: 2023/24 January-June

Pre-requisite Modules: BIO104

Co-requisite Modules:

Lecturer(s): Prof DC Eastwood

Format: Lectures and laboratory-based practicals

Delivery Method: Composite, lectures and practicals

Module Aims: This module provides an introduction into how microbes impact the world we see around us. Lectures and laboratory-based practicals will explore how microbes occupy almost every environment on the planet and drive the elemental cycles (carbon, nitrogen, phosphorous) on which all life relies. Lectures will cover microbial diversity and adaptations to extreme environments, elemental cycling in terrestrial and aquatic systems, and interactions with plants and animals. Practicals will develop this learning to investigate specific ecological examples of dynamic microbial communities.

Module Content: This module will use a combination of lectures (18 x 1 hour) and practicals (3 x 4 hours). Practicals will use specific examples highlighted in the lectures to put the theory-based learning into a real world context. The topics covered will explore diverse habitats and show how microbes have adapted to thrive and ultimately drive the existence of all organisms in the ecosystem.

The syllabus is split into four major themes:
1. Microbial diversity
- bacteria, Archaea and fungi; extremophiles,
2. Microbial nutrition and respiration
- heterotrophs and autotrophs; mechanisms of carbon assimilation; alternatives to oxygen respiration
3. Major biogeochemical cycles & how microbes influence them
- carbon, nitrogen, phosphorous, iron, sulphur and trace metals
4. Interactions with plants and animals
- symbionts and pathogens; endophytes, nitrogen fixation and mychorrhizal fungi, gut flora, common diseases of plants and animals.

Interdisciplinary skills in physics, chemistry and mathematics will be developed through:
i) Considering the energetics of chemical reactions which provide energy for growth and selection of nutritional modes based on underlying environmental conditions.
ii) How different elements are processed by cells and how microbes utilise the chemical properties of elements to generate energy.
iii) Quantify and critically assess microbial presence and diversity in habitats to determine their potential impact on habitats and interactions between different species.

Practical classes will investigate:
Microbial biodiversity in water column and in soil. How microbes alter the local chemistry to change the environment around the cell. Students will identify specialist nutritional modes and discuss how different microbes adapt to particular niches and interact with one another.

Specific skills employed include: aseptic technique and microbial culturing on selective media, light microscopy, isolation of crystals via basic chemistry techniques, generating and devising how to present data to allow critical analysis.

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

LO1) Describe and distinguish the major groups of microbes (bacteria, archaea, eukaryotic) and example habitats in which they are found,
LO2) Describe and form links between the broad morphological and biochemical variation within the microbial world,
LO3) Contrast and compare how the microbial communities in a particular environment affect the major biogeochemical cycles of life (carbon, nitrogen, phosphorous, iron, sulphur, and trace metals),
LO4) Demonstrate how microbe interactions are essential for the lifestyles of plants and animals, using specific examples.
LO5) Undertake practical skills needed to isolate and innumerate microbes from the environment, and be able to critically analyse and present such data sets to demonstrate diversity in the environment and discuss how small-scale microbial processes can have large scale ecological impacts.

Assessment:	Examination (50%) Coursework 1 (15%) Coursework 2 (35%)
Assessment Description: Examination (50% of total module mark: 2 hours examination; 30 MCQ (33% of examination mark) and one essay question (67% of examination mark) Coursework consisting of practical write up and data interpretation (50% of total module mark) Coursework 1: Experiments 1&2: Biogeochemistry & Plant fungal interaction method testing (15%) Coursework 2: Experiment 3: Winogradsky column, Nutritional mode selection and microbial diversity (35%)	
Moderation approach to main assessment: Moderation by sampling of the cohort	
Assessment Feedback: Formative and summative feedback on coursework and examinations. Individual and group feedback sessions with lecturer as appropriate.	
Failure Redemption: Re-submission of coursework, re-sit of examination	
Reading List: Slonczewski, Joan, author., Foster, John Watkins, author.; Zinser, Erik R., author., Microbiology : An evolving science, W. W. Norton & Company, 2020.ISBN: 0393420043	
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.	

BIO249 Introduction to field ecology

Credits: 15 Session: 2023/24 September-January

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Dr SC Hocking, Dr AP Devine, Dr PJ Neyland, Dr GR Thomas

Format: Five day residential field based practicals
Contact Hours will be delivered through a blend of field trips, live activities, online and on-campus

Delivery Method: Field based practicals, lectures, demonstrations, workshops

Module Aims: This field course comprises practical work employing ecological techniques appropriate to sample biodiversity and environmental parameters from a range of terrestrial and freshwater habitats (freshwater systems, woodlands, sand dunes). You will learn techniques for the identification of species, practice recording accurate field notes, and gain experience in the analysis and presentation of ecological data. Furthermore, you will be able to recognise different British temperate wildlife, habitats and indicator species associated with them.

This five-day course will be residential and delivered in Stackpole National Trust Field centre in September.

Module Content: Prior to undertaking the field course asynchronous activities have been provided on Canvas;

Introduction to UK Biodiversity:
- Geological Factors that Influence UK habitats
- Introduction to UK habitats
- Introduction to UK terrestrial vertebrates

Field course syllabus:
Woodland ecology and sampling techniques
Freshwater ecology and sampling techniques
Sand dune/coastal ecology and sampling techniques
Wild plant identification

Workshops:
Bat ecology
Careers in ecology
Experimental design

Intended Learning Outcomes: At the end of the module the student will:

1) Identify, describe and discuss a range of different UK temperate habitats, their associated biological diversity and wildlife
2) Work as a team and an individual to collect ecological field data using appropriate sampling techniques and be able to demonstrate, discuss and evaluate these techniques thereafter
3) Employ a range of employer relevant field techniques to accurately identify species such as dichotomous keys and field guides
4) Observe and record key scientific information on habitat and species features in a comprehensive field book
5) Analyse, present, interpret and appraise ecological data and synthesis into a comprehensive report.

Assessment: Coursework 1 (30%)
Coursework 2 (30%)
Coursework 3 (40%)

Assessment Description: Coursework 1: Field notebook
Coursework 2: Grassland or Woodland Infographic
Coursework 3: Freshwater Report

Moderation approach to main assessment: Moderation by sampling of the cohort

Assessment Feedback: Students will be provided with individual electronic feedback on submitted field reports and notebooks. There will also be a feedback session on campus in Semester 1 for the field notebooks

Failure Redemption: Resubmission of failed coursework or alternative assessment for the field notebook

Reading List: Sutherland, William J, Ecological census techniques : a handbook / edited by William J. Sutherland., Cambridge University Press, 2006.ISBN: 0521606365
Oliver Rackham author, Woodlands / Oliver Rackham., London : William Collins, 2015.ISBN: 9780008156916
Giller, Paul S; Malmqvist, Bjorn; University of Oxford, The biology of streams and rivers / Paul S. Giller and Bjorn Malmqvist., Oxford University Press, 1998.ISBN: 0198549776
Christer. Bronmark, Lars-Anders Hansson, The biology of lakes and ponds / Christer Bronmark, and Lars-Anders Hansson., Oxford University Press, 2005.ISBN: 9780198516132
Elizabeth A. C. Price (Elizabeth Anne Clewett), Lowland grassland and heathland habitats / Elizabeth A.C. Price ; illustrations by Jo Wright., Routledge, 2003.ISBN: 9780415187633

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

This is a Year 2 Biosciences module which is compulsory for biology students and will be held in September 2023 and will involve a residential field course to Stackpole National Trust Field Center.

The course is not open to visiting or exchange students due to the time of delivery. The course is run out of term time in September

BIO252 Ecological Data Analysis

Credits: 15 Session: 2023/24 September-January

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Prof L Borger, Dr N Franconi

Format: 16 hours practical IT workshops.
10 hours taught lectures.
11 hours Stats Help sessions.
3 hours computer-based continuous assessments.

Delivery Method: 16 hours practical IT workshops
10 hours taught lectures & feedback sessions.
11 hours Stats exercise and feedback sessions.
3 computer-based continuous assessments.
Weekly assigned readings and computer-based exercises.
Final data analysis project.

Module Aims: This module introduces students to the basics of analyzing ecological data, using the R Software Environment for Statistical Computing. The topics covered will be also broad enough to be equally applicable to basic data analysis across biology and the skills acquired are widely transferrable for non-academic jobs. Students will receive 8 computer-based workshops/practicals of 2 hours each, complemented by 10 lectures and 11 Stats exercise and Feedback sessions before each workshop. The module will cover 5 broad key themes: 1). Data analysis and statistics, reproducibility and the R Software Environment; 2). Data management; 3). Data visualization; 4). Data analysis - The linear model; 5). Data analysis - Presentation of results and outline of more advanced methods. The module will be subject to continuous assessment consisting of 3 pieces of computer-based work (60% of final mark), which will require the students to carefully complete all course work assigned on a weekly basis ('independent learning'), in order to be able to complete the assignments. A further 40% of the final mark will consist in a data analysis report, to be completed after the end of the course. Weekly readings and non-assessed computer-based exercises will be assigned, too.

Module Content: Computer-based workshops & taught lectures:

1). Statistical methods, reproducibility and the R Software Environment;
2). Data management;
3). Data visualisation;
4). The Linear Model - linear regression;
5). Model criticism (model diagnostics);
6). The Linear Model - analysis of variance (ANOVA);
7) The Linear Model - analysis of co-variance (ANCOVA);
8). Presentation of statistical results & report writing and data management.

Intended Learning Outcomes: At the end of this module students will have been exposed to the basics of how to handle and analyze scientific data using R, for exploratory and confirmatory purposes, communicate the findings, and store both the data and the codes used, to allow full replicability. The student is expected to be able to:

1. Accurately input data for statistical analysis into R, visualize the data and, taking into account the specific question asked, choose and conduct basic statistical analysis using the linear model and hypothesis tests, or be able to identify if it is not applicable.
2. Critically interpret the data and analyses and produce basic informative tables and graphs to report the results of different types of basic statistical models.
3. Be able to provide all the data and computer codes for a full replicability of all analyses.
4. Format the results for a scientific publication.
5. Be able to learn new methods and packages in R independently.

These outcomes will crucially rely on essential independent learning by the students between each of the weekly workshops. As each workshop will build upon the material learned in the previous sessions, which will need to be assimilated and practiced independently, regular work by the students each week after each lecture and each workshop will be essential. Also, without essential independent learning, following the instructions provided during each workshop, student will not be able to satisfactorily complete the continuous assessments and obtain the grade. To aid this, weekly readings and non-assessed (computer-based and non) exercises will be provided.

Assessment: In class test (Invigilated on campus) (20%)
Class Test 2 - Held under exam conditions (20%)
Class Test 3 - Held under exam conditions (20%)
Coursework 1 (40%)

Assessment Description: CW1: Visualizing data and models in R for exploratory and confirmatory analyses.
CW2: The linear model: simple linear regression and ANOVA
CW3: The linear model: linear model with interactions up to ANCOVA
Coursework 1: Statistical Analysis Report

Moderation approach to main assessment: Moderation by sampling of the cohort

Assessment Feedback: One-to-one feedback during the workshops by both lecturers and teaching assistants to students.
Taught lectures and exercise and feedback sessions.
Additional Stats Exercise and Help sessions to provide feedback and repetitions during the course.
Online help through Canvas.

Failure Redemption: Re submission of continuous assessment and/or final report.

Reading List: Michael J. Crawley author., Statistics : an introduction using R / Michael J. Crawley., Chichester : John Wiley & Sons, Ltd, 2015.ISBN: 9781118941096
Andrew P. Beckerman author., Owen L. Petchey author., Getting started with R : an introduction for biologists / Andrew P. Beckerman & Owen L. Petchey., Oxford : Oxford University Press, 2012.ISBN: 9780199601622
Whitlock, Michael C., Schluter, Dolph., The Analysis of Biological Data, Macmillan Learning, 2020.ISBN: 9781319325350
Grafen, Alan; Hails, Rosemary, Modern statistics for the life sciences / Alan Grafen, Rosie Hails., Oxford University Press, 2002.ISBN: 0199252319
Faraway, Julian James, Linear models with R / Julian J. Faraway., 2015.ISBN: 9781439887332
Ekstrøm, Claus Thorn; Sørensen, Helle, Introduction to statistical data analysis for the life sciences / Claus Thorn Ekstrøm, Biostatistics, Department of Public Health, University of Copenhagen, Helle Sørensen, Department of Mathematical Sciences, University of Copenhagen., 2015.ISBN: 9781482238938

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

Syllabus as stated is subject to modification due to staff availability. 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.

BIO258 Animal Physiology

Credits: 15 Session: 2023/24 September-January

Pre-requisite Modules: BIO104

Co-requisite Modules:

Lecturer(s): Dr TM Uren Webster

Format: 14 lectures, 2 research-focused lectures, 3 x 3h practicals, 2 workshops on quantitative physiology, 1 revision lecture, 3 x 1h drop-in 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 with lectures and practicals.

Available to Visiting and Exchange students.

Module Aims: "Physiology is the study of normal function in animals, encompassing chemical and physical activities within cells, tissues and organs. Less formally, physiology is the study of ""how animals work"". This module will explore integrative physiology, spanning genes to organ systems and will cover both vertebrate and invertebrate physiology, including terrestrial, aquatic and aerial examples. We will examine how animal physiology is fundamentally connected to the environment within an adaptive context, including examples of how animals are able to survive in harsh conditions and considering how they may respond to emerging environmental challenges."

Module Content: "Topics discussed during lectures:
~ Key principles in physiology
~ Energy metabolism and thermo-regulation
~ Respiratory and circulatory physiology
~ Osmoregulation, ion balance and excretory systems
~ Regulatory physiology: nervous and endocrine systems
~ Structural physiology
~ Digestive systems and the microbiome
~ Reproduction and endocrine disruption
~ Quantitative physiology

Laboratory practicals:
1) Temperature effects on zebrafish embryonic development
2) Osmoregulation in marine polychaetes
3) Molecular Physiology: Lactate Dehydrogenase Assay"

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

LO1) Describe, explain and compare the structure and function of major physiological systems for multiple lineages of animals using appropriate terminology and an appropriate level of detail
LO2) Describe and explain foundational topics in physiology: homeostasis, systems integration, systems regulation, scaling, constraints and adaptive responses to environment
LO3) Demonstrate an ability to integrate and compare knowledge from multiple systems to understand animal performance in different environments
LO4) Understand how physiological experiments are designed, analysed and interpreted
LO5) Use quantitative methods (algebra, statistics, visualisations) to describe and understand the physical, chemical and biological basis of physiological phenomena
LO6) Demonstrate ability to apply abstractions of learned principles to novel topics and problems
LO7) Demonstrate professional values, behaviour, and ethos
LO8) Demonstrate effective and efficient communication
"

Assessment:
Examination (50%)
Coursework 1 (25%)
Coursework 2 (25%)

Assessment Description: Exam (30 MCQ, 1 essay)
CW1: Laboratory practical report
CW2: Laboratory practical report

Moderation approach to main assessment: Moderation by sampling of the cohort

Assessment Feedback: Students will be assigned two pieces of coursework and one exam. Students will receive written feedback on all components and a model answer after the report has been marked. Students will also receive feedback in person on request after lectures, during drop-in sessions and during office hour sessions.

Failure Redemption: Re-sit failed elements in August

Reading List: Sherwood, Lauralee; Klandorf, Hillar; Yancey, Paul H, Animal physiology : from genes to organisms / Lauralee Sherwood, Hillar Klandorf and Paul H. Yancy., Brooks/Cole, 2013.ISBN: 9781111988715

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

Module not available to visiting or exchange students with exception of those within the school's existing exchange
programme.

BIO261 Population and Community Ecology

Credits: 15 Session: 2023/24 January-June

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Dr M Lurgi Rivera

Format: 10 hours lectures
18 hours PC lab
2 hours workshop
Group Presentation session

Delivery Method: Lectures, ICT workshops, group presentation workshop and e-learning

Module Aims: This module will introduce students to concepts and basic analytical tools to understand and predict the growth or decline of animal, plant and other populations for: individual species; interacting, multispecies (e.g., predator-prey) communities; and spatial networks connected by dispersal.

Students will become familiar with 5 major themes related to ecological dynamics: population growth and density dependence, competition, consumer-resource interactions and spatial processes. Students will develop skills in conceptual thinking and data analysis, using and developing ecological models to predict how populations change over time and space, as well as report writing and presentation skills. Students will learn about how these tools are used in practical situations like conservation and invasive species management.

The course will be structured with lectures introducing background information and core concepts being followed by corresponding PC lab sessions where students will gain experience of putting those concepts into practice. An additional workshop session will prepare students for group presentations dealing with classical concepts in population ecology.

Module Content: The module aims to build on the basics of population ecology taught at level 1. A holistic approach will be adopted, teaching students both classical ecological theory and practical, transferable skills. It aims to:
1) introduce students to some fundamental concepts, by comparing and contrasting various hypotheses in population, community and spatial ecology
- Exponential population growth, density dependence, antagonistic (consumer-resource) species interactions, dispersal and metapopulations, age/stage structure, basic types of population dynamics (stable, cyclic, chaotic).
2) consider modern themes in population ecology
- stability of ecological communities, functional responses, network theory, environmental change
3) teach students how to develop and simulate simple ecological models appropriately
- Single-species (Logistic), multi-species (e.g., Lotka-Volterra), Metapopulation and structured population models
4) link these models to existing data sets from natural and lab populations
- Linking population time series to ecological models via statistical estimation
5) prepare reports and group presentations to a professional standard

Practicals:
• Ecological modelling PC workshops
• Network analysis PC workshop
• PC data analysis workshop
• Classical Concepts in Population Ecology workshop

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

LO1) Recognise fundamental concepts and hypotheses in population, community and spatial ecology
LO2) Classify important features of basic population models
LO3) Recognise different stability states in population and community dynamics
LO4) Understand and analyse how functional responses arise and affect dynamics
LO5) Develop and use computer code to simulate simple single and multispecies ecological models
LO6) Apply simple statistical methods to estimate key demographic parameters from natural and lab populations
LO7) Recognise simple network metrics and applications
LO8) Understand how ecological models are applied to modern environmental and conservation challenges
LO9) Combine basic concepts covered in the course in a novel way to develop a new modelling framework that addresses a question of interest to the student

Assessment: Examination (50%)
Coursework 1 (40%)
Group Work - Presentation (10%)

Assessment Description: Final Exam: MCQ, Analytical & Short Answer Questions

Coursework 1: Personal Population Model

Group Presentation: Classical concepts in population ecology

Moderation approach to main assessment: Moderation by sampling of the cohort

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

Reading List: Turchin, Peter, 1957-, Complex population dynamics a theoretical/empirical synthesis, Princeton University Press, 2003.ISBN: 1400847281
Lehman, Lobert & Clark, Quantitative Ecology: A New Unified Approach, University of Minnesota Libraries Publishing, 2019.ISBN: 9781946135537
Gotelli, Nicholas J., 1959- author., A primer of ecology, Sinauer Associates, 2008 - 2008.ISBN: 9780878933181
Gotelli, Nicholas J., 1959-, A primer of ecology, Sinauer Associates, 1995.ISBN: 0878932704

Additional Notes: 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.