



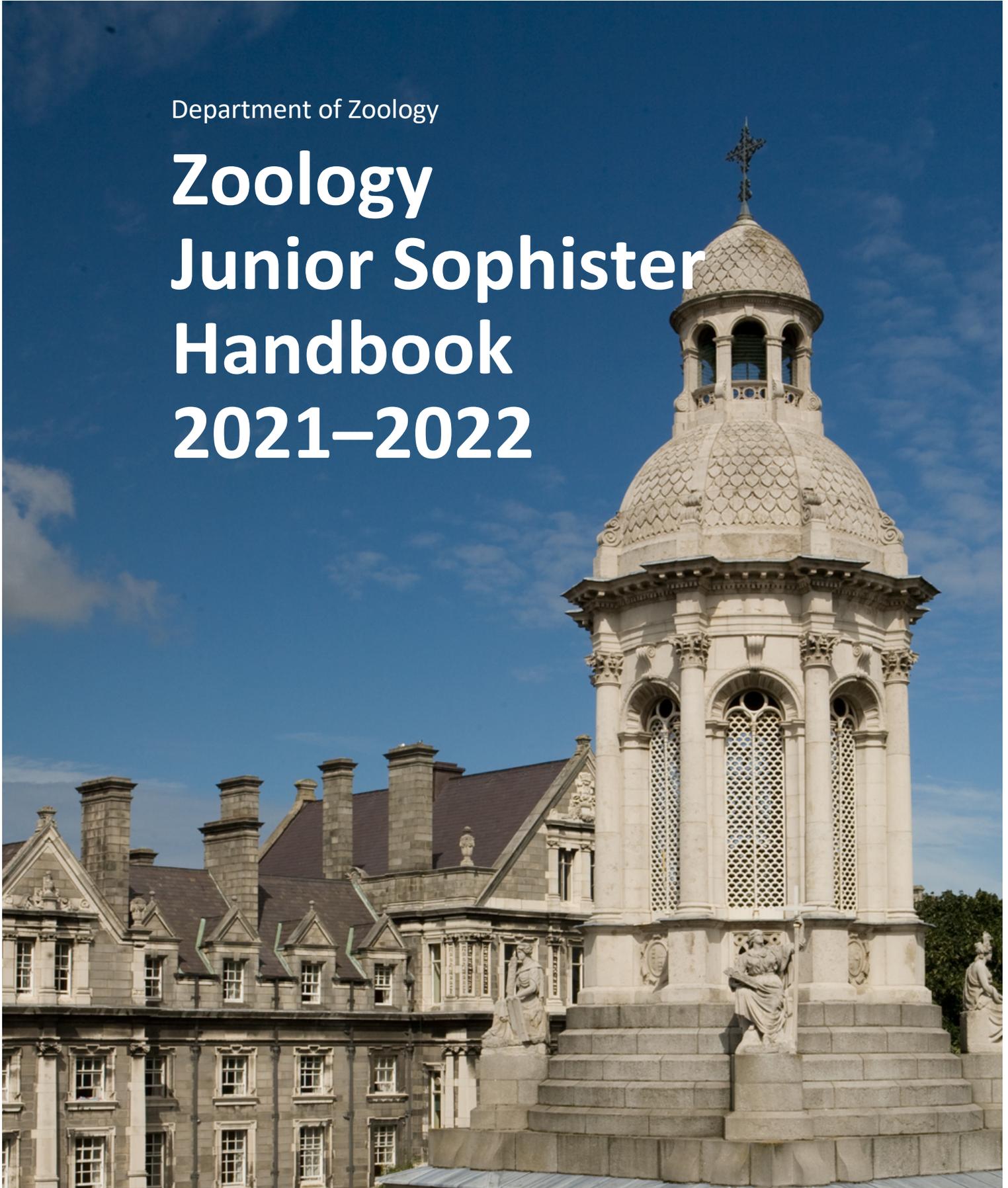
Trinity College Dublin

Coláiste na Tríonóide, Baile Átha Cliath

The University of Dublin

Department of Zoology

# Zoology Junior Sophister Handbook 2021–2022



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### **A Note on this Handbook**

This handbook applies to all students taking the Zoology Programme taught by the School of Natural Sciences. It provides a guide to what is expected of you on this programme, and the academic and personal support available to you. Please retain for future reference. Alternative formats of the Handbook can be made on request.

The information provided in this handbook is accurate at time of preparation. Any necessary revisions will be notified to students via email, blackboard and on the Zoology notice board, and will be updated on the Zoology website. Please note that, in the event of any conflict or inconsistency between the General Regulations published in the University Calendar and information contained in programme or local handbooks, the provisions of the General Regulations in the Calendar will prevail.



## Welcome

The discipline of Zoology at Trinity aims to make discoveries, educate and engage society in the science of whole organism biology, ecology & conservation, with a particular focus on animals. Through our research, education and engagement with society we seek to advance scientific understanding and contribute solutions to global challenges to the environment, health and human wellbeing.

The Zoology Moderatorship provides specific knowledge about animal biology and the associated academic disciplines including physiology, ecology, conservation, embryonic development, evolution, parasitology, entomology and wildlife biology in both marine and terrestrial environments. In addition, the courses and activities undertaken through the Junior and Senior Sophister years also provide opportunities for you to learn and practice high level skills in evaluation of evidence, critical thinking, quantitative analysis and written and oral communication. This broad and transferable skill set provides you with a solid scientific framework from which to think creatively and explore the natural world and its interactions with human society.

Our graduates develop an excellent foundation for a wide range of careers. We are proud of the achievements of our graduates who have succeeded across a wide range of industries including: academic research, education, veterinary, medical, journalism, technology, banking, exploration, tourism, environmental consultancy, career development, conservation, natural resource management, public service, aquaculture and film-making. Throughout your time here we are committed to providing you with inspiration, guidance, feedback and practice to enable you to embark on fulfilling and life-long learning in zoology and the natural sciences, regardless of your destination after graduation.

We look forward to working with you during your Sophister years and trust that you will find Zoology as fascinating and rewarding as we do.

***Nessa O'Connor***  
Zoology convenor

***Ian Donohue***  
Head of Discipline

## **Important information on COVID-19 restrictions and modes of teaching and learning**

In order to offer taught programmes in line with government health and safety advice, teaching and learning in Semester 1 up to reading week for your programme will follow a blended model that combines online and in-person elements to be attended on campus. This blended model will include offering online lectures for larger class groupings, as well as in-person or online classes for smaller groups. The differing modes of teaching and learning will vary among modules. Information on the modes of teaching and learning during the second part of Semester 1 and in Semester 2 will be available closer to the time.

Registered students are expected to be available to attend in-person teaching activities. Any request not to attend in person for exceptional reasons (such as travel restrictions or underlying health conditions) will be considered on a case-by-case basis by the relevant Head of School in consultation with College Health and there is no guarantee that these requests can be facilitated. It will depend on whether the programme learning outcomes and modes of assessment can be met through remote attendance.

For those students not currently in Ireland or planning to undertake travel before the start of term, if they are returning from a country that requires mandatory hotel quarantining or self-quarantining/isolating on arrival in Ireland, they are expected to allow for the period of restricted movement after arrival and prior to commencement of their studies, and therefore should factor this into their travel plans.

We would ask all students to adhere to the safety protocols when on campus for in-person teaching activities or student club and society events, i.e., mask wearing, hand washing, cough etiquette and to maintain social distancing. Please do not congregate outside lecture or tutorial rooms after your classes. We ask you to exit the building immediately after your event has finished. When term starts on 13 September (or 27 September for first years), students will be permitted on campus for any in-person events that they are involved in. Access to campus will be via a valid student ID card.

### **COVID-19 (Coronavirus) College Guidelines**

Significant complications arising from COVID-19 are likely to continue into the academic year 2021-22. Information for students relating to the implementation of government guidelines with respect to the ongoing global COVID-19 (Coronavirus) pandemic can be found on the College website at the (<https://www.tcd.ie/about/coronavirus/>). We will be teaching in a dynamic environment where societal restrictions may change in either direction and at short notice. It is important to keep up to date with the College's information and to keep in contact with your classmates, lecturers, course convenor and teaching office.

## Overview

Junior Sophister students in Zoology follow a training programme that consists of core theory and practical modules relating to ecology, physiology and biodiversity, as well as experimental design and analysis.

In the Senior Sophister year, in addition to coursework, students will take part in interactive tutorials and seminar presentations based on detailed literature analysis. They will also carry out and write-up an independent piece of research while working with one of the departmental research groups.

Brief descriptions of all modules available to Junior Sophister students in Zoology are given in this handbook.

## Programme Structure

Zoology is the scientific study of all aspects of animal biology, from the cell to ecosystems. This encompasses a knowledge, not only of the structure and function of different species, but also of the complex relationships, which govern the way in which animals relate to each other and to their surroundings. It provides an integrated view of all biological levels from the gene to the organism and higher.

Zoology provides fundamental knowledge relating to three areas of concern to society, namely the environment and its conservation, food production, and human and animal health and wellbeing. There is a growing awareness of environmental issues, including the conservation of biodiversity and the effects of climate change, to which zoologists contribute at all levels from research to policy making. Zoological research is also important in relation to food products and their pests while studies on a range of animals provide a basis for medical biology. Aspects of both environmental and medical biology feature strongly in the teaching and research programmes of the Zoology Department at Trinity. With a breadth of skills, challenges and responsibilities, we are confident that every one of the Trinity Graduate Attributes are met by the zoology sophister programme: <https://www.tcd.ie/TEP/graduateattributes.php>

### ***Learning Outcomes***

On successful completion of the two-year Sophister programme in Zoology, students will be able to:

- Set out the important basic concepts and current research developments in animal biology and associated discipline.
- Structure the diversity and evolution of the animal kingdom.
- Design useful experiments.
- Demonstrate technical competence in the handling of research facilities and operate safely in a laboratory environment, both individually and as a team member.

- Design sampling programmes and carry out fieldwork using standard procedures.
- Communicate effectively both orally and in a variety of contemporary scientific writing styles.
- Use appropriate editing, web-based, graphical and analytical software to analyse and interpret data and prepare reports and assignments.
- Critically analyse experimental results (including those obtained personally) and use appropriate statistical and other quantitative procedures for data handling.
- Proficiently search and critically assess scientific literature and databases
- Apply a scientific approach to problem solving.
- Articulate the contribution, including the ethical dimension, made by Zoology to society, in the realms of the environment, agriculture, natural resource management, human behaviour and health.

## **ECTS Weighting**

The European Credit Transfer System (ECTS) is an academic credit system based on the estimated student workload required to achieve the objectives of a module or programme of study. It is designed to enable academic recognition for periods of study, to facilitate student mobility and credit accumulation and transfer. The ECTS is the recommended credit system for higher education in Ireland and across the European Higher Education Area.

The ECTS weighting for a module is a measure of the student input or workload required for that module, based on factors such as the number of contact hours, the number and length of written or verbally presented assessment exercises, class preparation and private study time, laboratory classes, examinations, clinical attendance, professional training placements, and so on as appropriate. There is no intrinsic relationship between the credit volume of a module and its level of difficulty.

The European norm for full-time study over one academic year is 60 credits. 1 credit represents 20-25 hours estimated student input, so a 10-credit module will be designed to require 200-250 hours of student input including class contact time, assessments and examinations.

ECTS credits are awarded to a student upon successful completion of the programme year. Progression from one year to the next is determined by the programme regulations. Students who fail a year of their programme will not obtain credit for that year even if they have passed certain components. Exceptions to this rule are one-year visiting students, who are awarded credit for individual modules successfully completed.

## Contacts:

		Email (@tcd.ie)
Dr Nessa <b>O'CONNOR</b>	Associate Professor & Zoology Course Convenor	n.oconnor
Prof. Yvonne <b>BUCKLEY</b>	Chair of Zoology	buckleyy
Dr Ian <b>DONOHUE</b>	Associate Professor & Head of Discipline	ian.donohue
Prof. Celia <b>HOLLAND</b>	Professor of Parasitology	cholland
Dr Andrew <b>JACKSON</b>	Associate Professor	jacksoan
Dr Jacinta <b>Kong</b>	Research and Teaching Fellow	kongj
Dr Pepijn <b>LUIJCKX</b>	Assistant Professor	luijckxp
Prof. Nicola <b>MARPLES</b>	Professor	nmarples
Prof. Paula <b>MURPHY</b>	Professor	pmurphy3
Dr Marcin <b>Penk</b>	Teaching Fellow	penkm
Dr Jay <b>PIGGOTT</b>	Assistant Professor	piggottjj
Dr Nick <b>PAYNE</b>	Assistant Professor	paynen
Dr John <b>ROCHFORD</b>	Adjunct Associate Professor	rchfordj
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Ms Sinead <b>KELLY</b>	Technical Officer	kellys76
Dr Martyn <b>LINNIE</b>	Chief Technical Officer 1	mlinnie
Ms Fiona <b>MOLONEY</b>	Senior Executive Officer	fimolony
Prof. Patrick <b>WYSE- JACKSON</b>	Head of School	wysjcknp
Dr Carlos <b>Rocha</b>	Director of Teaching and Learning (Undergraduate)	rochac
Ms Mary <b>FOODY</b>	School Administrator	schnatsc

## Summary of the Junior Sophister Programme

### Module Structure

<b>Zoology</b>	
Semester 1 (S1)	Semester 2 (S2)
<b>Core Modules</b>	
ZOU33000: Marine Biology (5 credits)	ZOU33005: Evolutionary Biology (5 Credits)
ZOU33003: Animal Diversity 1 (5 credits)	ZOU33070: Experimental Design and Analysis (5 credits)
ZOU33004: Animal Diversity 2 (5 credits)	ZOU33086: Terrestrial Wildlife and Field Ecology (5 credits)
ZOU33010: Fundamentals of Ecology (5 credits)	ZOU33090: Desk Study: Zoology and Society (5 credits)
<b>Open Modules Scenario I</b>	
ZOU33050: Developmental Biology (5 credits)  OR GSU33003: Ice Age Earth (5 credits)	Choose 2 Modules ZOU33030: Introduction to Parasitology (5 credits)  OR BOU33122: Entomology (5 credits)  OR BIU33250: Introduction to Immunology and Immunometabolism (5 credits)  OR PGU33109 Neurophysiology (5 credits)
Trinity Elective (5 credits)	
<b>Open Modules Scenario II</b>	
ZOU33050: Developmental Biology (5 credits)	ZOU33030 Introduction to Parasitology

	(5 credits)  OR BOU33122: Entomology (5 credits)  OR BIU33250: Introduction to Immunology and Immunometabolism (5 credits)  OR PGU33109 Neurophysiology (5 credits)
GSU33003: Ice Age Earth (5 credits)	Trinity Elective (5 credits)
<b>Open Modules Scenario III</b>	
ZOU33050: Developmental Biology Biology (5 credits)  OR GSU33003: Ice Age Earth (5 credits)	ZOU33030: Introduction to Parasitology (5 credits)  OR BOU33122: Entomology (5 credits)  OR BIU33250: Introduction to Immunology and Immunometabolism (5 credits)  OR PGU33109 Neurophysiology (5 credits)

Please note: Students are expected to make a contribution towards the transport and accommodation costs of the field components of modules ZOU33000 and ZOU33086, which is usually between €250 – €300 each. Eligible students may apply to the Student Assistance Fund ([http://www.tcd.ie/Senior\\_Tutor/](http://www.tcd.ie/Senior_Tutor/)) for financial assistance.

## Brief Description of Junior Sophister Modules

*Where more than one lecturer is involved, the name of the module coordinator is given in italics. Further details will be provided by the module coordinator at the start of each module, including due-dates for assignments, schedules for lectures, tutorials, practicals and details of individual and group work.*

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### **ZOU33000 Marine Biology**

(5 credits – Semester 1 – 5-day field course (Dublin-based owing to COVID-related restrictions) plus 8 additional contact hours)

#### **Module Personnel:**

*Dr Nessa O'Connor*, Dr Nicholas Payne, Prof. Jim Wilson (Field Course only), Dr Conor Nolan (Field Course only)

#### **Module Content:**

Typically, this course commences with a 5-day residential field course at a marine research station. This year owing to the COVID-19 pandemic there will not be a residential field course away from Dublin. This year the field course component will be Dublin-based. This module will commence with an intense schedule for 5-days during week 3 that includes site visits to local shores near Dublin, practical classes on campus, live lectures, online and video materials, guest lectures and in-class assessments. During this week students will create their own field notebook that must be submitted at the end of the week when your field identification skills will be assessed. This fully immersive week is followed by a series of weekly lectures (with follow-up question and answer sessions if delivered online). This module is designed to teach students some of the key techniques and skills required for field-based environmental biology and to introduce key concepts in marine biology. This includes common species identification, benthic and pelagic sampling methods and experimental design. Students are required to keep detailed field notebooks.

This module introduces students to the oceanographic and ecological processes that underpin marine ecosystems and their associated biodiversity and functioning. Topics include: characteristic features of different marine ecosystems (e.g. rocky shores, coral reefs, deep seas); application (fisheries and aquaculture) and human impacts on marine ecosystems (disturbances, pollution and climate change).

#### **Learning Outcomes:**

1. Describe basic principles of marine processes (e.g. primary production) and factors that affect organisms living in marine environments.
2. Identify and describe the characteristic features of important marine ecosystems including: rocky shores, estuaries, saltmarshes, seagrass beds, mangroves, coral reefs, shallow seas and the deep sea.
3. Identify and describe human impacts on marine ecosystems.

4. Discuss key issues relating to fisheries, aquaculture, marine conservation and coastal management.
5. Use several field-based practical techniques and quantitative methods in the marine environment.
6. Identify common marine species and describe their key distinguishing features.

**Recommended Reading List:**

Kaiser, MJ et al. (2020) *Marine Ecology: Processes, Systems, and Impacts*. (3<sup>rd</sup> Edition) Oxford University Press.

Little, C, Williams GA & Trowbridge, CD (2009) *The Biology of Rocky Shores*. (2<sup>nd</sup> Edition) Oxford University Press.

Nybakken, JW & Bertness, MD (2005) *Marine Biology: An ecological approach*. Benjamin Cummings.

Speight, M & Henderson, P (2010) *Marine Ecology: Concepts and Applications*. Wiley Blackwell.

Taylor, L & Nickelsen, E (2018) *Ireland's Seashore: A field guide*. Collins Press.

**Assessment Details:**

50% continuous assessment: 50% annual written examination.

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## **ZOU33003 Animal Diversity 1**

(5 credits – Semester 1 – 35 contact hours)

**Module Personnel:**

Dr Nicholas Payne, Dr Jacinta Kong, Dr Nessa O'Connor

**Module Content:**

This module provides a detailed consideration and comparison of the structure, life cycles and general biology of animal groups from sponges through to amniotes (reptiles, dinosaurs, birds and mammals) but taking a comparative approach to functional aspects of life by drawing links across all animal groups. The module is based on lectures and tutorials, with additional self-learning exercises. The module will take an evolutionary and comparative rather than taxonomic perspective on animal diversity. The module will open by charting the diversification of several of the main groups of invertebrates (including Porifera, Cnidaria, Echinodermata, hexapoda, Platyhelminthes, Nematoda, Molluscs and Chordates), followed by the evolution of chordates and concludes with the conquest of land by the Tetrapods. Throughout, the

module will use form and function to draw comparisons across taxonomic groups, such as considering locomotion across cartilaginous fish, bony fish and amphibia.

**Learning Outcomes:**

On successful completion of this module, students will be able to:

1. Identify and describe the characteristic features of Porifera, Cnidaria, Echinodermata, hexapoda, Platyhelminthes, Nematoda, Molluscs and Chordates with specific examples.
2. Give examples of the major chordate taxa and compare their physiology, anatomy and life history.
3. Describe the basic anatomy, and adaptive features of the chordate classes and give a reasoned identification of representative specimens of the classes (and in some cases orders & families) of the Chordata.
4. Understand the distinguishing characteristics and their function for major evolutionary transitions such as the diversification of marine 'fish', the conquest of the land by Tetrapods; the origin and radiation of amniotes.

**Recommended Reading List:**

Hickman, Keen, Larson, Eisenhour, l'Anson & Roberts. 2014. Integrated Principals of Zoology. ISBN 978-1259562310

Kardong. 2014. Vertebrates: Comparative Anatomy, Function, Evolution. ISBN 978-0078023026

**Assessment Details:**

50% continuous assessment. 50% annual written examination.

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**ZOU33004 Animal Diversity 2**

(5 credits – Semester 1– 31 Contact Hours)

**Module Personnel:**

Dr Andrew Jackson, Dr Jacinta Kong

**Module Content:**

This module provides a detailed consideration and comparison of the structure, life cycles and general biology of animal groups focussing on the amniotes (reptiles, dinosaurs, birds and mammals) but taking a comparative approach to functional aspects of life by drawing links to anamniotes and invertebrates. The module is based on lectures, practicals and tutorials, with additional self-learning exercises. The module will take an evolutionary and comparative rather than taxonomic perspective on amniote diversity. The module will open by describing how amniotes adapted to terrestrial living through the diversification of their morphological, physiological and behavioural characteristics, and the escape into the air by the birds. Throughout, the

module will use form and function to draw comparisons across taxonomic groups, such as considering locomotion such as flight across birds, mammals, reptiles and insects. The module will conclude by taking a macro-ecological perspective on the diversity of animal life in order to identify the main drivers of diversity at global, long term scales.

**Learning Outcomes:**

On successful completion of this module, students will be able to:

1. Give examples of the major amniote taxa and compare their physiology, anatomy and ecology.
2. Describe the basic anatomy, and adaptive features of the vertebrate classes and give a reasoned identification of representative specimens of the classes (and in some cases orders & families) of the vertebrates.
3. Use allometric scaling approaches to compare form and function across taxonomic scales.
4. Review the palaeontological evidence for such evolutionary transitions as the evolutionary transition from dinosaurs to birds, and the evolution of endothermy in mammals, birds, fishes, and non-avian reptiles.
5. Explain the main macro-ecological processes that drive the origination and extinction of species on global scales.

**Recommended Reading List:**

Hickman, Keen, Larson, Eisenhour, l'Anson & Roberts. 2014. Integrated Principals of Zoology. ISBN 978-1259562310

Kardong. 2014. Vertebrates: Comparative Anatomy, Function, Evolution. ISBN 978 0078023026

**Assessment Details:**

50% continuous assessment: 50% annual written examination.

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**ZOU33005 Evolutionary Biology**

(5 credits –Semester 2– 35 Contact Hours)

**Module Personnel:**

Dr Pepijn Luijckx, Prof. Nicola Marples

**Module Content:**

*“Nothing in biology makes sense except in light of evolution”* – T. Dobzhansky. Evolution plays a central role in almost every biological process ranging from adaptation to rising temperatures, spread of multi drug resistant bacteria, conservation of small populations, spread of invasive species to understanding human and animal behavior. This course will provide students with an advanced

understanding of current evolutionary thinking by introducing new ideas and extending concepts already encountered in the fresher years. Special attention will be given to how selection shapes adaptation.

***Learning Outcomes:***

On successful completion of this module, students will:

1. Have gained an advanced understanding of evolutionary theory.
2. Have a basic understanding of population genetics.
3. Be familiar with the processes of evolutionary change over time and space.
4. Have a good understanding of how species interactions affect fitness.
5. Have a good understanding of how co-operation in animal societies is maintained.

**In addition, students will be able to:**

1. Have critical discussions and form their own opinion on among others: species concepts, genetic conflict and the limits of selection.
2. To identify the different types of selection.
3. Build and interpret phylogenetic trees.
4. Read primary literature and present a summary to the class as a presentation.

***Recommended Reading List:***

The following books will give a classic background. The rest of the reading will be primary literature according to topic.

Davies, Krebs and West 2012 **An Introduction to Behavioural Ecology** (4<sup>th</sup> edition).  
Publisher – Blackwell Science, Oxford. (ISBN 9781405114165)

Barnard, Christopher J. 2003. **Animal Behaviour: Mechanism, Development, Function and Evolution**. Publisher – Prentice Hall, Harlow. (ISBN 0130899364)

Alcock, John. 2009. **Animal Behaviour: An Evolutionary Approach** (9<sup>th</sup> edition)  
Publisher – Sinauer Associates, Sunderland, Mass. (ISBN 9780878932252)

Richard Dawkins 2016 **The Selfish Gene 40<sup>th</sup> Anniversary edition** (4<sup>th</sup> edition)  
Publisher – Oxford University Press. (ISBN: 9780198788607)

***Assessment Details:***

40% continuous assessment: 60% annual written examination.

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## **ZOU33010 Fundamentals of Ecology**

(5 credits – Semester 1 – 35 Contact Hours)

### **Module Personnel:**

*Dr Ian Donohue, Prof. Fraser Mitchell*

### **Module Content**

This module examines the factors that affect the distribution, growth and survival of plant and animal communities. It describes how organisms interact with their environment and the role that they have in ecosystem and community structure. There is an introduction to the concepts and models that help to explain and predict organism distributions and interactions. The module comprises interrelated components of lectures, practical sessions and fieldwork. It has been designed to provide a foundation to ecological theory and its application.

### **Learning Outcomes:**

On successful completion of this module students should be able to:

1. Define what we mean by ecology and describe its principles and practice.
2. Show a firm methodological and theoretical understanding of the study of the distribution and abundance of species.
3. Describe and evaluate unifying concepts of distributions and ecological processes (e.g. feeding strategies, interspecific interactions, etc.).
4. Show, through practical exercises, a good approach to project work.
5. Show enhanced communication skills through a variety of techniques.

### **Recommended Reading List:**

Begon, M., Townsend, C.R. & Harper, J.L. (2006) *Ecology: from Individuals to Ecosystems*. Fourth edition. Blackwell Publishing.

Townsend, Begon & Harper (2008) *Essentials of Ecology*. Third edition. Blackwell Publishing.

### **Assessment Details:**

50% examination, 50% continuous assessment.

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## **ZOU33030 Introduction to Parasitology**

(5 credits – Semester 2 – 30 Contact Hours)

### **Module Personnel:**

*Prof. Celia Holland*

### **Module Content:**

The significance of the host-parasite relationship and the processes associated with the definition of parasitism are discussed in this module. Examples from important parasite phyla are reviewed with a focus upon life cycle strategies, ecology, pathology

and control. The epidemiology of parasitic diseases including important differences between microparasites and macroparasites are defined. The significance of parasite distributions within host populations is highlighted. External and internal factors, which influence parasite populations, are outlined and particular attention is paid to host behaviour, genetics and immunity. The concept of a parasite community at the infracommunity and component community level is developed. The challenges associated with parasite control are explored. The practical work or workshops provide access to a wide range of parasitic material and gives emphasis to the diversity of parasitic lifestyles and forms. Concepts include parasitic adaptations for infection, the significance of parasite distributions in infected hosts, behavioural changes in parasitised hosts and the nature of parasite communities.

***Learning Outcomes:***

On successful completion of this module, the student will be able to:

1. Know the broad context of the host-parasite relationship and recall key definitions of parasitism.
2. Identify a range of parasites from four major groups and recognize the epidemiological differences between microparasites and macroparasites.
3. Explore three internal factors that influence parasite populations and develop an understanding of strategies for parasite control.
4. Locate and identify parasites from a range of hosts in the laboratory.
5. Explore the impact of parasitism on host fitness and behaviour.
6. Understand the concept of a parasite community.
7. Become familiar with aspects of experimental design and write up the results of a laboratory experiment or workshop in the form of a scientific paper.
8. Present a lightning talk on a parasite of your choice.

***Recommended Reading List:***

Goater, T.M., Goater, C.P. and Esch, G.W. (2014). **Parasitism: The Diversity and Ecology of Animal Parasites**. 2<sup>nd</sup> Edition. Publisher Cambridge University Press, Cambridge (ISBN 978-0-521-12205-4). A range of scientific papers posted on Blackboard.

***Assessment Details:***

50% continuous assessment (practical or workshop write-up): 50% annual written examination.

## **ZOU33050 Developmental Biology**

(5 credits – Semester 1; – 35 Contact Hours)

### **Module Personnel:**

*Prof. Paula Murphy*

### **Module Content:**

This module consists of a series of lectures, tutorials and laboratory sessions that deals with a range of developmental topics emphasising a molecular approach to understanding the principles of animal development. A number of animal model systems will be dealt with and the contribution of each to our overall understanding of development discussed. Specific topics will include the following: Developmental genetics: the identification of genes that regulate development in *Drosophila* and vertebrates, Positional determination: how the body plan of the embryo is laid down including the role of homeo-box genes, Induction: the role of cell and tissue interactions and signaling cascades, Developmental neurobiology: positional determination within the vertebrate central nervous system, neuronal diversity and axonal guidance, neural crest cells and development of the peripheral nervous system. Other topics include limb development, organogenesis, and evolutionary developmental biology.

### **Learning Outcomes:**

On successful completion of this module, the student will be able to:

1. Demonstrate familiarity with the key principles of embryonic development.
2. Demonstrate familiarity with the model animals that are used for developmental studies and why they have been so important.
3. Describe the key events in building a complex multicellular animal, the common and species features
4. Integrate an understanding of molecular control of cell differentiation and the key molecules involved with morphological events in the embryo e.g. the molecules associated with neural tube patterning.
5. Observe and identify key features of vertebrate embryos and use morphological criteria to uncover the stage of embryonic development.
6. Demonstrate familiarity with internet resources that aid modern developmental research
7. Work in groups to carry out desk-top research using genome project resources.

### **Recommended Reading List:**

Gilbert, Scott F. 2018. *Developmental Biology* (11th edition) Sinauer Associates.

Gilbert, Scott F., Barresi M. 2019. *Developmental Biology* (12<sup>th</sup> edition)

Wolpert, Lewis and Tickle, Cheryll. 2019. *Principles of Development* (6th edition) Oxford University Press, Oxford.

### **Assessment Details:**

50% continuous assessment (Data analysis report, practical exercise submissions and Group desk top project): 50% annual written examination.

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## **ZOU33070 Experimental Design and Analysis**

(5 credits – Semester 2 – 28 Contact Hours – Core Module)

### **Module Personnel:**

*Prof. Celia Holland*

### **Module Content:**

This module will aim to put data collection and analysis in the context of research design and will be an important foundation for the Senior Sophister research project. The module consists of two parts. The emphasis will be practical with a more 'hands on' approach rather than the theory of statistics. Initially students will be taught about experimental design, data collection and sampling and the use of spreadsheets for data entry. This will lead on to preliminary data exploration and issues of normality. Emphasis will be placed upon the importance of visually exploring the data prior to the use of statistical tests. Summary statistics, including measures of centre and spread, skewness, kurtosis, percentiles and boxplots, will be covered. Then the module will move on to explore the concept of hypothesis testing and the need to compare two or more means. This will involve the use of t-tests and analysis of variance. Other types of data will also be introduced including the analysis of frequencies. The relationship between two variables in the context of regression analysis will also be explored. Finally, a data set will be used to bring the entire process together starting with simple data exploration through summary statistics to more complex analyses. The aim of the second part of the module is to address, in more detail, the fundamentals of experimental design and to explore how previous projects were conducted. In addition, students will learn how to write a moderatorship project proposal.

### **Learning Outcomes:**

On successful completion of this module, the student will be able to:

1. Address the fundamentals of experimental design and use hypothesis testing to answer biological questions.
2. Appreciate instruments for data collection, and how to explore and analyse data within the context of research design.
3. Explore a variety of data sets using graphical and summary techniques.
4. Outline the requirements of parametric statistical tests and recognize the applicability of four such tests.
5. Learn how to calculate statistical tests by hand and use the statistical package R to explore and analyse data.
6. Learn how to write a moderatorship project proposal, design an experiment and analyse the findings of a scientific paper in a group setting.

### **Recommended Reading List:**

Ruxton, Graeme D. and Colegrave, Nick. 2011. *Experimental design for the life sciences* (3rd edition) Publisher – Oxford University Press, Oxford (ISBN 9780199569120).

**Assessment Details:**

100% continuous assessment (four assessments – short answer test, data analysis exercise (Part 1), designing an experiment, completing both ethics and safety assessments for the moderatorship project (Part 2)).

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**ZOU33090 Desk Study: Zoology and Society**

(5 ECTS credits – Semester 2)

**Module Personnel:**

*Dr. Pepijn Luijckx*, Carla Harper

**Module Content:**

Students will research the scientific literature, synthesise and write an extended essay on a selected topic of current interest concerning Zoology and Society (sociological, ethical, medical or environmental). The finished product will conform to the general format of a scientific review article.

**Learning Outcomes:**

On successful completion of this module, students will be able to:

1. Comprehend the peer-review process for scientific literature.
2. Search, locate and critically assess scientific literature and databases on issues related to Zoology and Society.
3. Demonstrate the skills to critique published material and to differentiate between primary, secondary and tertiary sources.
4. Develop and convey clear and logical arguments with respect to such topical issues.
5. Write an effective scientific review.
6. Articulate the contribution, including the ethical dimension, made by Zoology to society, in the realms of the environment, agriculture, human behaviour and health.
7. Evaluate reference management software tools for individual needs.

**Assessment Details:**

100% Continuous Assessment

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## **ZOU33086 Terrestrial Wildlife and Field Ecology**

(5 credits –Semester 2 – 5 day field course plus 10 contact hours)

### **Module Personnel:**

*Prof. Yvonne Buckley, Dr John Rochford, Prof. Nicola Marples, Dr Pepijn Luijckx*

### **Module Content:**

This two-part module begins with a series of lectures in Hilary Term, which offer an introduction to terrestrial biodiversity and wildlife biology, both globally and regionally. Topics covered will include: assessment of biodiversity from individual, population, community and landscape scales and the importance of foraging ecology, habitat selection, inter- and intra-specific competition, territoriality, dispersion, population dynamics and regulation for determining diversity and distribution of animals. There will also be a particular focus on the origins, development and current status of the Irish vertebrate fauna.

The lecture series will be complemented, in week 37, by a five day residential field course in Glendalough, Co. Wicklow, during which field techniques used for the study of terrestrial ecosystems will be introduced, with an emphasis on habitat and population assessment of mammals, insects and birds and their interactions with plants and the abiotic environment. Field visits will help with an understanding of contrasting habitats and approaches to conservation management. Students will carry out and present a mini-project during the last two days of the course.

In the event of continuing restrictions related to Covid-19 this module will be delivered as either 1) a series of day trips to sites in the Dublin area OR 2) a combination of online teaching and day-trips in the Dublin area OR 3) a combination of online teaching with field activities local to your own location. In all cases you will need to be available for teaching activities during the scheduled week and we will let you know as far in advance as possible which teaching modes will be used.

### **Learning Outcomes:**

On successful completion of this elective, the student will be able to:

1. Demonstrate the relationship between determinants of the patterns of terrestrial biodiversity and the practice of wildlife management and conservation
2. Recognise and evaluate the main factors influencing the conservation status of species, in particular habitat selection and requirements, population processes and interspecific interactions
3. Explain the origin, diversity and status of the current Irish vertebrate fauna.
4. census mammals and insects safely using a variety of the most commonly used methods, and birds by sight and song.
5. Construct habitat maps and appreciate the importance of scale in such maps.
6. Assess anthropogenic effects on the environment and evaluate some control measures used to minimise them in nature reserves.
7. Design, conduct and present a small scale field study investigating an ecological question.

**Recommended Reading List:**

Primack, Richard B. 2010. **Essentials of Conservation Biology** (5<sup>th</sup> edition).

Sinauer Associates, Sunderland, Mass. (ISBN 9780878936403)

Groom, Martha J., Meffe, G.K. and Carroll, C.R. 2006. **Principles of Conservation Biology** (3<sup>rd</sup> edition). Sinauer Associates, Sunderland, Mass. (ISBN 0878935185)

**Assessment Details:**

50% continuous assessment (based on field course activities and tasks): 50% annual written examination.

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## **BOU33122 Entomology**

(5 credits – Semester 2 – 30 Contact Hours)

**Module Personnel:**

*Prof. Jane Stout*

**Module Content:**

There are more species of insects on Earth than any other group of organisms and they are of massive ecological and economic importance. This module will address behavioural, social, ecological and applied aspects of entomology, including their role in delivering ecosystem services (such as biocontrol and pollination), invasive species (such as fire ants and harlequin ladybirds) and conservation (both in Ireland and internationally). The practicals will provide students with the skills for sampling and identification of insects, which will be further enhanced through an individual project.

**Learning Outcomes:**

On successful completion of this module, the student will be able to:

1. Categorise insects according to their key features into the main order groups; know the distinction between insects and other arthropods.
2. Describe some of the range of behaviours employed by insects for foraging, defending and reproducing.
3. Develop understanding of the role of insects in ecosystem processes and their interactions with other organisms.
4. Explain their value as providers of ecosystem services.
5. Quantify the economic importance of insects (both positive and negative) to humans.
6. Evaluate the conservation biology of insects at national and international levels.

**Recommended Reading List:**

Price PW, Denno RF, Eubanks MD, Finke DL, Kaplan I (2011) *Insect Ecology: Behavior, Populations and Communities*. Cambridge University Press

**Assessment Details:**

50% continuous assessment: 50% annual written examination.

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## ***GSU33003: ICE AGE EARTH***

(5 credits – Semester 1 – 30 Contact Hours)

### ***Module Personnel:***

Professor Fraser Mitchell

**ECTS Credits:** 5

### ***Module Content:***

The last 2.6 million years of Earth history have witnessed dramatic climatic and environmental changes. This module provides an overview of these major environmental changes, their causes, and their significance for human development. It contrasts 'glacial' and 'interglacial' worlds, examines the nature of the transitions between them, explores some potential causes of change, and illustrates their environmental impacts. In the process, a range of key environmental records are considered, along with the "proxies" used to develop them.

### **Learning outcomes:**

On successful completion of this module students should be able to:

- Explain why global climates have varied dramatically over the last 2.6 million years.
- Describe the spatial and temporal variation in past climate change.
- Describe the long term impact of climate change on ecosystems.
- Describe the techniques used to reconstruct past climates.
- Describe the techniques used to reconstruct past ecosystems.
- Evaluate the contribution of climate and human activity to ecosystem dynamics.
- Relate the relevance to past ecosystem change to current and future ecosystem function.

### ***Recommended Reading List:***

- Bradshaw, R.H.W. & Sykes, M. (2014). *Ecosystem Dynamics: From the Past to the Future*. Wiley Blackwell. 334pp. Located in Botany Library.
- Roberts, N. (2014). *The Holocene. An Environmental history*. (3<sup>rd</sup> Edition). Wiley Blackwell. 376pp. Located in Botany Library.

### ***Assessment Details:***

100% continuous assessment.

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## **PGU33109 Neurophysiology**

(5 ECTS credits – Semester 2)

This open module is administered by the Trinity College Institute for Neuroscience within the Department of Biochemistry in the School of Biochemistry and Immunology.

### **Module Personnel:**

Dr Eva M Jiminez-Mateos; [jimenez@tcd.ie](mailto:jimenez@tcd.ie)

### **Module Content:**

The lectures in this module focus on how the nervous system works. Lectures will describe the structure and function of neurons, how they communicate and how they are arranged to form the nervous system. Topics include electrical properties of neurons, properties and physiological functions of ion channels, synaptic excitability, transmission and plasticity and the delivery and interpretation of sensory information into the central nervous system. Part of the course is also devoted to describing methods to record both cellular and brain activity. This module is designed to provide an understanding of how the brain functions at a cellular and systems level.

### **Learning Outcomes:**

On successful completion of this module, the student will be able to:

1. Describe the neurophysiological activity of peripheral and central neurons involved in sensory information processing.
2. Define the physiological roles of the brain regions and pathways involved in the planning, initiation and control of movement.
3. Identify the brain activity patterns associated with distinct sleep states and describe the neurophysiological basis of sleep and wakefulness.
4. Relate cellular and synaptic neuronal activity to the coordinated brain oscillations recorded by electroencephalography (EEG).
5. Relate how synaptic plasticity at cellular and network levels underlies long-term
6. Alterations in behaviour associated with learning and memory, addiction.

### **Recommended Reading List:**

Principles of Neural Science by Eric Kandel , James Schwartz , Thomas Jessell , Steven Siegelbaum , A.J. Hudspeth

### **Assessment Details:**

30% In Course Assessment: 70% Examination.

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## **BIU33250 Introduction to Immunology & Immunometabolism**

(5 ECTS credits – Semester 2)

Note: Previously, known as 'BIU33140'. This open module is administered by the School of Biochemistry and Immunology.

### **Module**

### **Personnel:**

Dr Frederick Sheedy, Jean Fletcher, Michael Carty, Ed Lavelle, Richard Porter, Luke O'Neill

### **Module Content:**

<b>Week</b>	<b>Lecture Topic</b>	<b>Lecturer</b>
23	Innate Immunity 1- Introduction to the Immune System	FS
23	Innate Immunity 2 – Innate Defences	FS
23	Innate Immunity 3 – Cellular Response to infection	FS
23	Innate Immunity 4 – PRR Signalling	FS
24	Innate Immunity 5 – Cytokines	FS
24	Innate Immunity 6 – DCs & Antigen Presentation	JF
24	Adaptive Immunity & Infection 1 – T-cell Receptor	JF
24	Adaptive Immunity & Infection 2– T-cell Signalling	JF
24	Adaptive Immunity & Infection 3 - T-Effector T-cells	JF
25	Adaptive Immunity & Infection 4 - B-lymphocytes & Plasma Cells	MC
25	Adaptive Immunity & Infection 5 – Antibodies	MC
25	Adaptive Immunity & Infection 6 – Infection & Covid-19	EL
26	Adaptive Immunity & Infection 7 - Vaccination	EL
26	Immunometabolism 1 – Intermediary Metabolism	RKP
26	Immunometabolism 2 – PPARs	RKP
26	Immunometabolism 3 – Nucleotide Metabolism	RKP
27	Immunometabolism 4 – Cancer Cell Metabolism	RKP
27	Immunometabolism 5 – Immune Cell Metabolism	RKP
27	Immunometabolism 6 - Metabolites as Signalling Molecules	LON
27	Immunometabolism 7 – Applied Immunometabolism	LON
28	<b><i>In-class MCQ</i></b>	
29	<b><i>Reading Week</i></b>	
35	<b><i>Trinity Week</i></b>	
36	<b><i>Revision Week</i></b>	
37/38	<b><i>Assessment</i></b>	

### **Learning Outcomes:**

On successful completion of this module, the student will be able to:

1. Identify cells, receptors and soluble component of the innate immune system and how they function to eliminate pathogen.
2. Define how an adaptive immune response is initiated and how different types of adaptive immune responses are used to eliminate particular pathogens.
3. Identify how the immune system can cause disease and how it can be exploited therapeutically
4. Recall key central energy and intermediary metabolic pathways and appreciate their importance in cellular function

5. Apply knowledge on cellular metabolism to diseases including cancer and inflammation

***Recommended Reading List:***

The recommended text for this module is Janeway's Immunobiology published by Norton's Books, currently in its 10<sup>th</sup> Edition. Further reading will be given out by lecturers during the module.

***Assessment Details:***

60% End of year examination, 40% in course assessed.

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## Moderatorship Regulations

### Attendance

Attendance at all lectures, tutorials and practical sessions is compulsory for Junior Sophister students in Zoology (see College Calendar, Section H – General Regulations and Information). Students who have been unable, through illness or other unavoidable cause, to attend any part of the course are required to notify the relevant lecturer and submit a medical certificate or other relevant document to the Executive Officer in the Zoology Department Office on the day of their return to College – see the section below on Absences from College. Attendance at all sessions may be recorded and unexplained absence on any more than two occasions may result in a Non-Satisfactory return, following an interview with the Coordinator of the Zoology Moderatorship. Students reported as Non-Satisfactory in the Michaelmas and Hilary terms of a given year may be refused permission to take their annual examinations and may be required by the Senior Lecturer to repeat their year.

### In-course/ Continuous Assessment (CA)

Most Zoology modules are assessed, at least in part, by work completed during or immediately after the delivery of the module (practical write-ups, spot-tests, mini projects, web CT exercises, laboratory reports, etc.).

- The dates for completion and submission of individual in-course assessments, and other pertinent information, will be given to you at the start of each module by the module coordinator.
- Module assessments are designed to meet the learning outcomes of the module. As such, **All** components of Continuous Assessment must be submitted for assessment unless with prior agreement with the module coordinator. This is essential because missing CA work is recorded automatically with a code indicating “AB – absent without permission” and the grades for those modules are withheld meaning progression to the next year or graduation, in the case of Senior Sophister, is not applied.
- An important learning outcome of all university courses is the development of time management skills. This is formalised in our modules by stressing the importance of time-keeping with regard to assignments. Work submitted after the due date will have marks deducted unless good cause (e.g. medical certificate) is provided. There is a general policy of a 5% reduction of marks, per day, up to a maximum of one week after the due date at which point the assessment will receive zero marks. Modules may specify their own policy on deductions as appropriate for the various forms of assessments specific to the module: in these cases, module coordinators will communicate the details to you at the start of the module.
- Assessment marks and feedback may be obtained from the Teaching Office or directly via Blackboard approximately three weeks after the submission date.

## Access to Exam Scripts (*Freedom of Information Act*)

Following publication of the final examination results, students may have access to their examination scripts upon written application to the Zoology / Botany / Environmental Sciences teaching office or Course Coordinator.

## Plagiarism

Plagiarism is **academic fraud** and, as such, is an offence against University discipline. The University considers plagiarism to be a **major** offence, and subject to the disciplinary procedures of the University.

In order to support students in understanding what plagiarism is and how they can avoid it, an **online central repository**, to consolidate all information and resources on plagiarism, has been set up and can be accessed at <http://tcd-ie.libguides.com/plagiarism>

## Appeals Policy

Trinity College Dublin, the University of Dublin, herein referred to as Trinity, recognises that in the context of its examination and assessment procedures, a student may wish to appeal a decision made in relation to their academic progress. The appeals procedure may be used only when there are eligible grounds for doing so and may not be used simply because a student is dissatisfied with the outcome of a decision concerning their academic progress. Further information at: <https://www.tcd.ie/teaching-learning/academic-affairs/ug-regulations/appeals.php>

## Junior Sophister Examinations & Assessment

The grade for each student at the end of the Junior Sophister year is compiled from the results of the examinations in Michaelmas and Trinity Term and work assessed throughout the year.

It is expected that the Junior Sophister examinations in Trinity Term 2022 will consist of a number of 1.5 and 3 hour written papers (timetable to be announced later). It is expected that the majority of modules assessed during the Michaelmas examination periods will comprise of open book assessments, however, some in person exams may take place. This will be communicated to you as soon as possible. The number of questions per module and the marks allocated relate to its ECTS credit value. Past examination papers are available on the College web at:

<https://www.tcd.ie/academicregistry/exams/past-papers/annual/>

### Balance of Marks

The balance of marks awarded for written examinations (EX) and in-course/continuous assessment (CA) for each module is shown below. There is full internal compensation between components of the module marks.

<b>CORE MODULES</b>		EX	CA
ZOU33000	Marine Biology	50%	50%
ZOU33003	Animal Diversity 1	50%	50%
ZOU33004	Animal Diversity 2	50%	50%
ZOU33005	Evolutionary Biology	60%	40%
ZOU33010	Fundamentals of Ecology	50%	50%
ZOU33070	Experimental Design and Analysis		100%
ZOU33086	Terrestrial Wildlife and Field Ecology	50%	50%
ZOU33090	Desk Study: Zoology and Society		100%

<b>OPEN MODULES</b>		EX	CA
ZOU33030	Introduction to Parasitology	50%	50%
ZOU33050	Developmental Biology	50%	50%
BOU33122	Entomology	50%	50%
PGU33109	Neurophysiology	70%	30%
BIU33250	Introduction to Immunology and Immunometabolism	60%	40%
GSU33003	Ice Age Earth		100%

The Junior Sophister examinations (assessments and papers) form Part 1 of the examinations for the Moderatorship in Zoology, contributing 20% to the overall degree award, with the remaining 80% coming from the Senior Sophister examinations. The [Harmonized Assessment and Progression Regulations](#) (Model 2), as adopted by Council in 2012, applies to all examinations in Zoology.

Note that you may if you wish, choose to not undertake the final year of this degree which awards B.A. in Science with Honours in Zoology (B.A. Hons.). Instead, you may apply, upon successful completion of your Junior Sophister year, to be awarded a B.A. (Ord.) degree.

## Grading Guidelines

The following guidelines are used when awarding grades for essays and examination answers in the Sophister years in Zoology.

Class	Mark Range	Criteria
I	90-100	<b>EXCEPTIONAL ANSWER;</b> This answer will show original thought and a sophisticated insight into the subject, and mastery of the available information on the subject. It should make compelling arguments for any case it is putting forward, and show a rounded view of all sides of the argument. In exam questions, important examples will be supported by attribution to relevant authors, and while not necessarily giving the exact date, should show an awareness of the approximate period. In essays, the referencing will be comprehensive and accurate.
	80-89	<b>OUTSTANDING ANSWER;</b> This answer will show frequent originality of thought and make new connections between pieces of evidence beyond those presented in lectures. There will be evidence of awareness of the background behind the subject area discussed, with evidence of deep understanding of more than one view on any debatable points. It will be written clearly in a style which is easy to follow. In exams, authors of important examples may be provided. In essays all important examples will be referenced accurately.
	70-79	<b>INSIGHTFUL ANSWER;</b> showing a grasp of the full relevance of all module material discussed, and will include one or two examples from wider reading to extend the arguments presented. It should show some original connections of concepts. There will be only minor errors in examples given. All arguments will be entirely logical, and well written. Referencing in exams will be sporadic but referencing should be present and accurate in essays.
II-1	65-69	<b>VERY COMPREHENSIVE ANSWER;</b> good understanding of concepts supported by broad knowledge of subject. Notable for independent synthesis of information rather than originality. Evidence of relevant reading outside lecture notes and module work. Mostly accurate and logical with appropriate examples. Occasionally a lapse in detail.

	60-64	<b>LESS COMPREHENSIVE ANSWER;</b> mostly confined to good recall of module work. Some independent synthesis of information or ideas. Accurate and logical within a limited scope. Some lapses in detail tolerated. Evidence of reading assigned module literature.
II-2	55-59	<b>SOUND BUT INCOMPLETE ANSWER;</b> based on module work alone but suffers from a significant omission, error or misunderstanding. Usually lacks synthesis of information or ideas. Mainly logical and accurate within its limited scope and with lapses in detail. The content is sensible and relates a reasonable narrative, if limited in synthesis and sophistication. There is reasonably good citation practice and a well presented reference list in essays.
	50-54	<b>INCOMPLETE ANSWER;</b> suffers from significant omissions, errors and misunderstandings, but still with understanding of main concepts and showing sound knowledge. Several lapses in detail. Content may be disjointed and lacking good structure. Poor citation practice and reference list in essays.
III	45-49	<b>WEAK ANSWER;</b> limited understanding and knowledge of subject. Serious omissions, errors and misunderstandings, so that answer is no more than adequate.
	40-44	<b>VERY WEAK ANSWER;</b> a poor answer, lacking substance but giving some relevant information. Information given may not be in context or well explained, but will contain passages and words, which indicate a marginally adequate understanding.
F-1	30-39	<b>MARGINAL FAIL;</b> inadequate answer, with no substance or understanding, but with a vague knowledge relevant to the question.
F-2	0-29	<b>UTTER FAILURE;</b> with little hint of knowledge. Errors serious and absurd. Could also be a trivial response to the misinterpretation of a question.
U.G		Ungraded

## The J.B. Gatenby Prize

This prize, founded in 1968 by Mrs R.R. Edwards in memory of the late Professor J.B. Gatenby, is awarded annually to the member of the Junior Sophister class who carried out the best practical work during the year. Current value - €65.

## General Information

### Health and Safety

The **Safety, Health and Welfare at Work Act 2005** places legal responsibility on students to take care of their own safety and that of others around them. The Medical Declaration forms signed in Junior Freshman year stated your agreement to abide by College's safety policies. These policies cover work in the laboratory, the field and all activities on campus. You must read the Faculty of Engineering, Mathematics and Science Health and Safety Guidance Manual to inform yourself of these procedures, which can be found on the Faculty local home page at: <https://www.tcd.ie/stem/faculty-health-safety.php>

Most practical classes for Junior Sophister Zoology are held in BIOLAB1, 2 or 3 in the Biology Teaching Centre. Practical work for ZO3003, using the Zoological Collections, is carried out in the Zoology Museum. Specific safety issues relating to the teaching laboratories will be explained to you before you commence practical work. These will include information on chemical, biological, mechanical and fieldwork hazards. If you are unsure of any aspect of safety, it is your duty to ask questions until you fully understand the risks and the protections in place to mitigate them.

Fire drills are held regularly. On hearing a fire alarm you must listen to all instruction given and gather at the Assembly Point until you are permitted to return to the building. Do not bring your belongings or ignore the alarm. This may delay your exit from the building.

The Discipline of Zoology has further health and safety information important to you on its local access page at: <https://www.tcd.ie/Zoology/local/> If you have any questions regarding Safety, Health or Welfare please contact [Zoosafe@tcd.ie](mailto:Zoosafe@tcd.ie)

### Emergency Procedure

In the event of an emergency, **dial Security Services on extension 1999 (+ 353 1 896 1999).**

Security Services provide a 24-hour service to the College community, 365 days a year. They are the liason to the Fire, Garda and Ambulance services and all staff and students are advised to always telephone extension 1999 (+ 353 896 1999) in case of emergency.

Should you require any emergency or rescue services on campus, you must contact Security Services. This includes chemical spills, personal injury or first aid assistance.

It is recommended that all students save at least one emergency contact in their phone under ICE (In Case of Emergency).

## Data Protection

Trinity College Dublin uses personal data relating to students for a variety of purposes. We are careful to comply with our obligations under data protection laws and we have prepared this short guide to ensure you understand how we obtain, use and disclose student data in the course of performing University functions and services. More information is available at [https://www.tcd.ie/info\\_compliance/data-protection/student-data/](https://www.tcd.ie/info_compliance/data-protection/student-data/)

## Student Support

There are many support services available in College including Tutor Services, Mature Student Office, Equality Officer, Day Nursery, Health Services etc... Information on these and how to access them is available on the consolidate Student Supports and Services page <https://www.tcd.ie/students/supports-services/>

## Students Union

“The Students’ Union is run for students by students. We represent you at college level, we fight for your rights, we look after your needs, and we are here for you to have a shoulder to cry on or as a friend to chat with over a cup of tea. As a student of Trinity College, you are automatically a member of TCDSU. Remember – we work for you, so if you think we should be focusing on a particular issue, get in touch!

The Students’ Union website is a vital resource for Trinity students. It’s the place to go if you have a problem in College - it has information on accommodation, jobs, campaigns, as well as information pertaining to education and welfare. The website also contains contact details for each Sabbatical Officer.

To stay in touch through social media, find us on Facebook at ‘Trinity College Students’ Union’ to keep up to date with what we’re doing. You can also follow us on Twitter @TCDSU.”

More information is available at <https://www.tcdsu.org>

## Illness/Disability

Issues regarding welfare and wellbeing are best brought to your tutor’s attention or to the College Health Service. Students with a medical condition or disability that is likely to impair their performance in courses or examinations (e.g. asthma, dyslexia, etc.) are encouraged to inform the Zoology Moderatorship Coordinator, in confidence. Please be aware of, and use where necessary, the various student support services in College. Information relating to all support services is available at: <http://www.tcd.ie/students/supports-services/> Medical certificates, LENS reports,

etc. should be lodged, at the time of issue, with your Tutor, and copies submitted to the Executive Officer in the Zoology Department Office as appropriate.

## Co-curricular Activities

Co-curricular and extra-curricular activities are an important part of life and development. There are many societies and sports clubs available in College and you are encouraged to engage with these to maintain a healthy work-life balance. More information is available at <http://trinitysocieties.ie> and <https://www.tcd.ie/Sport/student-sport/ducac/>. A reflection tool has been designed to assist you in capturing and articulating the learnings from any co- or extra-curricular activity; visit [tcd.ie/students/reflection](http://tcd.ie/students/reflection) for more information and to download the tool.

## Absence from College

Zoology, Botany and Environmental Science employs an approach similar to the Fresh years as administered by the Science Course Office.

### Medical Certificates/Absence due to Illness

Where a student misses an assigned laboratory practical class through illness, they should **(a)** submit a Medical Certificate to the Zoology teaching office **on the day of their return to College** and **(b)** inform the laboratory practical supervisor of their absence at the next session. The Science **Medical Certificate Form (for use with med cert from doctor)** is available from Zoology office.

### Self-Certification/Absence due to illness - three days or less

For periods of illness of **three days or less (but no more than seven days in any year)** a student may 'self-certify' their illness on the forms supplied, again to the Zoology teaching office on the day of their return to College. The Science **Medical Self Certification Form (use for 3 days med not covered by doctor)** is available from the Zoology teaching office.

### Other Absences

Students who request to be absent from a laboratory practical classes or tutorials (with or without an associated assessment) for any other reason, such as a sporting event or other situation, should inform the Zoology teaching office and zoology course convenor well in advance of the event (preferably a week beforehand). The Science **Absence from College Form, Sport or Other** is also available from the Zoology teaching office. Please note that filling in this form is **not a guarantee** that you will be afforded any accommodations with regard to marks or assignment of an alternative lab or tutorial session. In such cases decisions on what action/accommodations will be

given is purely at the discretion of the individual disciplines concerned. The Zoology teaching office and course convenor do not have any jurisdiction in this situation.

**Students who will not be in attendance for any extended duration during term time must have permission from Senior Lecturer via their tutor to be absent from College. Please refer to the absence regulations noted in the previous page.**

Excuses for absence, presented after the event, **will not be entertained**. Students who anticipate that their sporting commitments may necessitate more than the occasional absence from College (e.g. Sport Scholars, etc.) should discuss their situation with their tutor, and the zoology course convenor.

**NOTE:**

Please note that these regulations do not apply to absence from examinations. Students who are absent from examinations must contact their tutor as a matter of urgency and present any medical information/documentation to them.

## **Research Ethics**

In line with Trinity College Dublin's Policy on Good Research Practice, all research in the School of Natural Sciences (SNS) should be conducted according to the overarching ethical principles of "respect for the individual subject or population, beneficence and the absence of maleficence (research should have the maximum benefit with minimal harm) and justice."

All individuals involved in research should facilitate and ensure research is conducted ethically. Ethical conduct in research is a shared responsibility. Primary responsibility rests with the Principal Investigator(s). Ethical responsibilities and legal obligations may overlap. All staff and students conducting research are required to ensure that their research is carried out in compliance with this policy. Ethical review is required before any studies involving human subjects, other living organisms and/or the natural environment, encompassing biosphere, geosphere, hydrosphere and atmosphere, commence. This requirement applies to staff, postgraduate and undergraduate students and volunteers/interns. Field-based and laboratory work cannot commence until ethical review has been completed and approval has been gained. Staff or students planning to undertake research should complete the Research Ethics Application available from <https://naturalscience.tcd.ie/research/ethics/>

## **The Zoological Society**

A number of societies run by students, and affiliated to the Central Societies Committee, cover interests relevant to students in Zoology, the most important of which is the Dublin University Zoological Society.

ZOOSOC <http://trinitysocieties.ie/society/?socid=120> was founded in 1974 and promotes an awareness of all aspects of zoology and natural history. It holds regular meetings and field trips, and its members have participated in numerous wildlife surveys and fundraising campaigns.