



Trinity College Dublin

Coláiste na Tríonóide, Baile Átha Cliath

The University of Dublin

School of Natural Sciences

Environmental Sciences

Senior Sophister Handbook 2020-2021

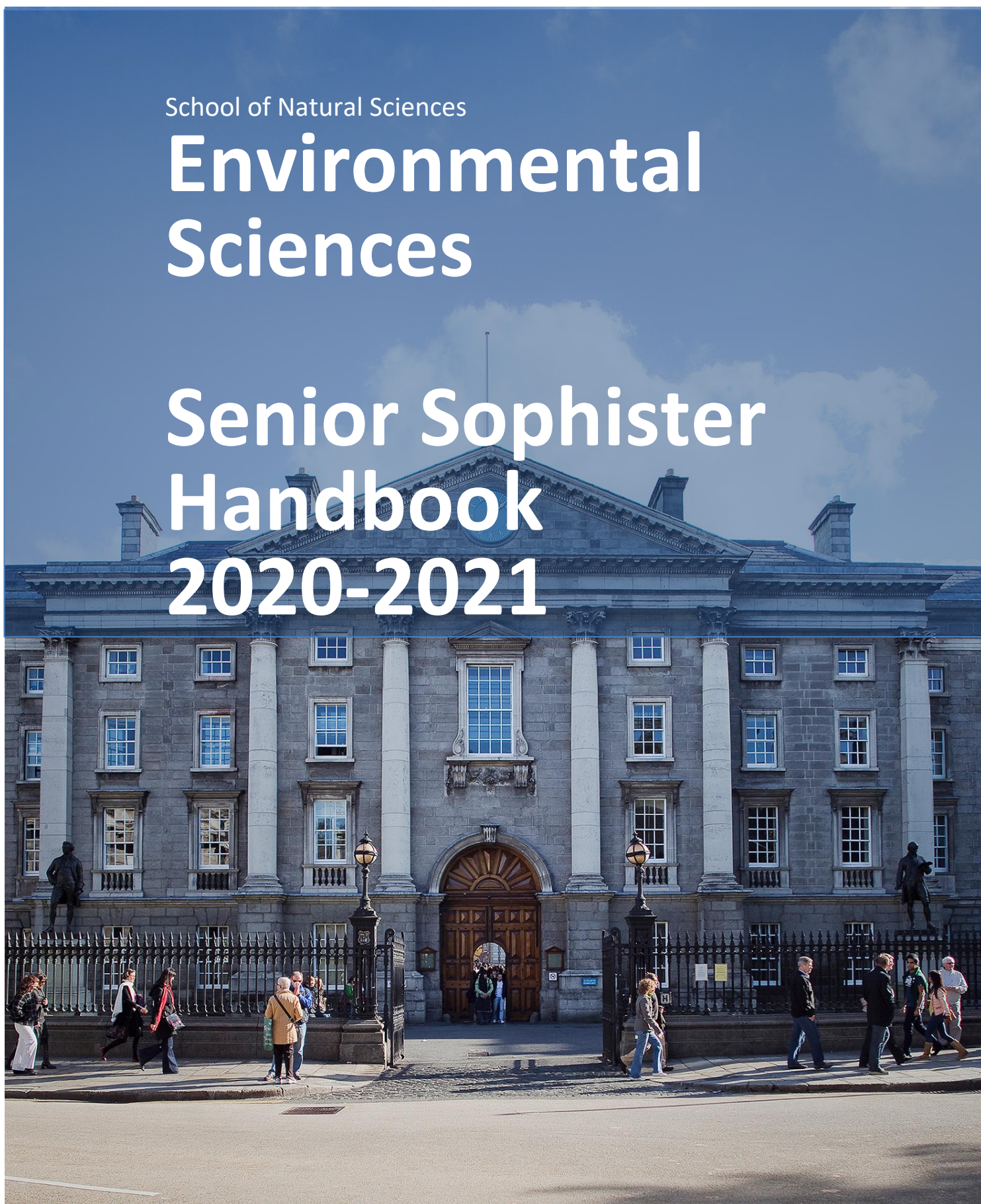


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A note on this Handbook

This handbook applies to all students taking the Environmental Sciences 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 download and retain a copy for future reference.

The information provided in this handbook is accurate at time of preparation. Any necessary revisions will be notified to students via email, and will be updated on the Environmental Sciences undergraduate programme website.

Your attention is drawn to the University Calendar Part 1 (the relevant parts of which are available at registration, or from your tutor) and, in particular, sections G & P that outline general rules governing all students progression through College and the Faculty of Science; in addition your attention is drawn to Sections H5/H6 regarding attendance. In the event of any conflict or inconsistency between the General Regulations published in the University Calendar and information contained in course/departamental handbooks, the provisions of the General Regulations will prevail.

COVID-19 (Coronavirus) College Guidelines

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/>).

Welcome

Welcome to the Environmental Science Moderatorship Programme! This handbook aims to provide you with a basic overview of the Programme and the courses you will undertake during your Junior Sophister year with us.

Environmental Sciences is by its nature a multidisciplinary academic field, comprising a study of the frequently complex interactions between the biological, chemical and physical components of our environment. The environmental science discipline has evolved over the last numbers of decades as key environmental problems such as climate change, pollution, sustainable development, deforestation and desertification to name a few, have become the focus of scientists, policy makers and the general public. Environmental scientists have training that is similar to other physical or life scientists, but is specifically applied to the environment. A broad scientific knowledge is required which involves a fundamental understanding of the physical and life sciences in addition to economics, law and the social sciences.

The undergraduate degree course offered by the School of Natural Sciences has been designed to provide for the needs of students with an interest in this rapidly developing academic and professional field. The programme comprises specially designed modules plus suitable modules from contributing disciplines. Field study and laboratory skills represent a core component of the programme and these are blended with the theoretical content to provide our graduates with the training required to become highly successful practitioners in this field.

It is important to outline that the approach to teaching and learning has had to change in order to minimise spread of COVID-19, and we realise that this coming year will be strange for many of you. Unfortunately, these arrangements have meant either the cancellation or rescheduling of field work in many cases, and the need to teach on-line for medium to large classes. As the situation and associated restrictions change we will endeavour to keep you fully informed, but please feel free to email me for further information.

We look forward to working with you during your sophister years with us and trust that you will find Environmental Sciences as fascinating and rewarding as we do.

Dr Matthew Saunders
Environmental Science Course Advisor
September 2020



Course objectives and learning outcomes

Our mission is to:

- make you aware of the basic concepts, key challenges and current research developments in Environmental Science;
- enable you to understand the basis of good experimental design;
- teach you to work efficiently and safely in laboratories;
- enable you to become a competent field researcher;
- teach you to critically analyse quantitative data;
- develop your written and oral communication skills;
- develop your skills to work effectively in a group and independently; and
- make you socially aware, particularly in relation to the contribution that Environmental Science makes to society.

On successful completion of this programme, students should be able to:

- identify and describe plant and animal communities and analyse their distribution;
- demonstrate the principles of geochemical cycling in the global context with specific reference to environmental change;
- discuss the principles of hydrology and its relationship with groundwater quality;
- discuss the causes and effects of terrestrial, atmospheric and marine pollution and present day mitigation strategies;
- show a good working knowledge of skills and tools, such as spatial data analysis and statistical techniques, which can be used selectively to address complex problems, or to conduct closely guided research;
- identify, formulate, analyse and suggest reasoned solutions to current environmental problems;
- design an Environmental Impact Assessment for a range of diverse habitats;
- critically assess scientific literature;
- work effectively as an individual, in teams and in multidisciplinary settings; and
- communicate effectively with both the scientific community and with society at large.

In the Senior Sophister (fourth) year you will research and write a thesis on a project in the field of Environmental Sciences. In the past, students have undertaken a diverse range of projects in many fields, including air pollution, waste management, restoration ecology, invasive species, water quality, habitat management and greenhouse gas emissions.

Significant emphasis in this Moderatorship is placed on the student acquiring a broad range of laboratory and field skills that are relevant to Environmental Science practitioners. While the delivery of both field and laboratory teaching may be affected by COVID-19 restrictions, some field taught modules may incur travel and/or accommodation costs. While the School makes every effort to keep expenditure for field courses as low as possible, however, it is necessary that students should budget appropriately. For information on financial assistance, contact: Senior Tutor's Office, House No. 27 (stosec@tcd.ie), or your tutor.

Note:

Students receiving local authority grants may be eligible for local authority support. Letters confirming attendance on courses can be obtained from the Course Director.

Please note: If cheques from Local Authorities are not received before the start of the Field Course, students will be required to pay the full amount and will be refunded this amount on receipt of cheques from Local Authorities. You are therefore advised to apply to your local Authority for funding well in advance of the field trips.

The European Credit Transfer System

The European Credit Transfer and Accumulation System 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 Credits are the recommended credit system for higher education in Ireland and across the European Higher Education Area.

The Credit 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, 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. The Trinity academic year is 40 weeks from the start of Michaelmas Term to the end of the annual examination period. 1 Credit represents 20-25 hours estimated student input, so a 5-Credit module will be designed to require approximately 120 hours of student input including class contact time and assessments.

Credits are awarded to a student only upon successful completion of the course year. Progression from one year to the next is determined by the course regulations. Students who fail a year of their course will not obtain Credit for that year even if they have passed certain component modules. Exceptions to this rule are one-year and part-year visiting students, who are awarded Credits for individual modules successfully completed.

In addition to the specified contact hours indicated under each module, you are expected to engage in work associated with the module to bring your input up to a total of at least 125 hours for a 5 Credit module.

Course structure

The Senior Sophister Environmental Science Moderatorship Programme consists of 60 European Credit Transfer Systems (ECTS Credits) per year. Senior Sophisters take a total of 45 mandatory Credits and optional modules up to 15 Credits. Some modules are examined entirely by in-course assessment however most are assessed by a combination of in-course assessment and examination. Further details on the assessment breakdown for each module can be found in the module descriptors below.

Core Modules

Core Modules	
Semester 1	Semester 2
ZOU44030 Data Handling (5 credits)	FBU44000 Capstone Research Project (20 credits)
ZOU44092 Environmental Impact Assessment (5 credits)	
BOU44111 Restoration Ecology and Re-wilding (5 credits)	
ZOU44060 Research Comprehension (5 credits)	
ESU44052 General Environmental Sciences (5 credits)	

Optional Modules (students choose 15 credits from the following modules)

Optional Modules	
Semester 1	Semester 2
BOU44109 Vegetation Description and Analysis (5 Credits)	BOU44103 Plant Conservation and Biodiversity (5 Credits)
BOU44107 Plant-Animal Interactions (5 Credits)	ESU44054 Spatial Analysis using GIS (5 credits)
ZOU44013 Conservation & Wildlife Management (5 Credits)	GGU44927 Environmental Governance 2* (5 Credits)

*GGU44927 Environmental Governance 2 has a fixed student quota.

Module Descriptions

Core Modules

ZOU44030: DATA HANDLING

Course type: Core

Coordinator: Professor Andrew Jackson

ECTS Credits: 5 Credits

Assessment: 100% Continuous assessment

Description:

Being able to form research questions and challenge our hypotheses by collecting and analysing data forms the basis of scientific inquiry. An understanding of data analysis is an essential skill-set for all scientists. This module will consist of 2 tutorial sessions per week spanning all of semester 1. One of the tutorials each week will be used to develop class-directed questions relevant to current scientific thinking. As a class, we will form hypotheses, collect data and develop appropriate analytical techniques to answer our research questions. Concurrently, online material including video podcasts will be used to develop hands-on skills in the use of the very powerful and flexible statistics package R for data analysis. The module will start with basic probability theory, introduce different statistical distributions and culminate in learning how General Linear Models form a common framework for conceptualizing and analyzing your data. At the end of the module you will have analysed a wide variety of data types and will have used the transferable and widely applicable statistics package R to analyse your data.

Learning outcomes:

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

- Summarise and communicate quantitative results graphically and textually to scientific standards.
- Apply appropriate statistical analyses of commonly encountered data types.
- Explain the context of the analyses within a hypothesis driven framework of scientific logic.
- Use the R statistical computing language for data analysis.
- Create R notebooks for documenting analyses and sharing with collaborators.

ZOU44092: ENVIRONMENTAL IMPACT ASSESSMENT

Course type: Core

Coordinator: Professor Ian Donohue

ECTS Credits: 5 Credits

Assessment: 50% Continuous assessment, 50% Examination

Description:

This module involves an introduction to the principles and processes of Environmental Impact Assessment, particularly in relation to national and international requirements. All stages of the EIA process, from initial project screening to the final review, are covered, with the emphasis throughout on the role of the natural scientist.

Strategic Environmental Assessment is also briefly covered. In addition to the lectures, students carry out a scoping exercise for a proposed development and conduct a quality review of an actual EIS.

Learning Outcomes:

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

- Outline the development of the Environmental Impact Assessment process as a management and legislative tool from its inception in the 1960s to its present form.
- Explain the stages in the process from initial screening to post-project monitoring and auditing.
- Conduct a scoping exercise for a project and produce a draft Scoping Statement.
- Critically evaluate Environmental Impact Statements prepared for a wide range of projects.
- Compare and contrast the process of Environmental Impact Assessment with Strategic Environmental Assessment.
- Describe Appropriate Assessment in the context of Natura 2000 sites.

BOU44111: RESTORATION ECOLOGY AND REWILDING

Course type: Core

Coordinator: Professor Marcus Collier

ECTS Credits: 5 Credits

Assessment: 100% Continuous assessment

Description:

Restoration ecology, like conservation biology, is a 'crisis' discipline, having emerged as a science/practice response to the social and ecological impacts directly and indirectly driven by human activities. Restoration ecology has proven to be highly effective in some cases but has also given rise to some controversy as well as policy difficulties. Rewilding and novel ecosystems are new and controversial areas within restoration ecology making it difficult to know how and when to intervene. This module will introduce you to the challenges and opportunities, failings and fallacies of the complex world of restoration ecology, rewilding, and the work of restoration ecologists. It will look at how rewilding could be the most efficient of nature-based solutions and asks if this is feasible in the modern world. As the discipline struggles to navigate global climate issues, integrate with the social sciences, incorporate politics and economics, and derive policy actions, this module will draw on case studies of restoration globally to will challenge students to rethink ecology and ecosystems in the Anthropocene. It will also discuss areas of employment where students might consider after graduation, with some invited guests providing insight into the practice of restoration and rewilding.

Learning Outcomes:

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

- Understand the principals of restoration ecology as they apply in a modern context

- Comprehend the nuanced nature of restoring ecosystems and habitats as well as re-introducing species in practice
- Carry out restoration case study analysis
- Understand the complex relationship between ecology, social values and policies
- Evaluate the success of restored ecosystems and species

ZOU44060: RESEARCH COMPREHENSION

Course type: Core

Coordinator: Professor Pepijn Lujckx

ECTS Credits: 5 Credits

Assessment: 40% CA, 60% Written Exam

CA: A blog post: A blog post will be written on the content of the seminars. **Exam:** A series of questions on one or more unseen scientific papers (or parts of these papers) related to the seminar series that will test interpretation of scientific data, insight and critical thinking.

2 hours end of year written exam or a 48 hour take home exam depending on the Covid-19 situation.

Assessment for this module will take place entirely in Semester 2.

Description:

No matter what you do when you graduate, in most jobs you will be expected to read, understand and interpret data. Often this will be in a subject you are unfamiliar with, or will use unfamiliar methods or study organisms. The aim of this module is to help you to develop the ability to understand and interpret research from a broad range of scientific areas, and then to develop opinions about this research and how it fits into the “big picture”. This module also aims to improve your ability to communicate all kinds of scientific research to a general audience, a skill that is currently in great demand.

Learning outcomes:

- Comprehend and report on scientific studies presented both orally and in primary literature.
- Identify the aims and/or hypotheses in scientific studies and analyse the research methods employed to address them.
- Interpret and generalise the results of the studies in the context of the wider subject area.
- Assess and evaluate the conclusions of the scientific study.
- Interpret graphical, tabular and pictorial representations of data and infer results in the context of the subject matter.
- Summarise scientific studies in language and style suitable for consumption by a wide audience in an online form.

ESU44052: GENERAL ENVIRONMENTAL SCIENCES

Course type: Core

Coordinator: Professor Matthew Saunders

ECTS Credits: 5 Credits

Assessment: 50% Continuous assessment, 50% Assignment

Description:

This module provides an opportunity for students to build on the content covered throughout the Sophister Environmental Sciences programme, and to explore in greater detail the key challenges facing Environmental Scientists today. Guest lectures also form a core part of this module, and will be given by practitioners in the environmental sciences field. Students are expected to integrate their approach to this material with the perspectives and skills they develop during their Sophister years. Appropriate literature relating to the Junior and Senior Sophister core (mandatory) modules will be recommended for detailed study.

The module is assessed through both continuous assessment and a problem-solving lab-based paper.

Learning outcomes:

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

- Understand and describe topical issues related to the environment.
- Develop critical appreciation of the scientific literature.
- Explain important basic concepts and current developments in such key areas of environmental sciences as ecology, freshwater hydrobiology, hydrology, wildlife biology and environmental governance.
- State confidently the theoretical and practical aspects relating to essential field and laboratory techniques.

FBU44000: RESEARCH PROJECT

Course type: Core

Module Personnel: Professor Ian Donohue, All Zoology, Botany and Centre for the Environment Staff

ECTS Credits: 20 Credits

Assessment: 100% Continuous assessment: Thesis (18 ECTS credits), project proposal and associated documentation (2 ECTS credits)

Description:

The project provides an important opportunity for students to plan and carry out a detailed and original piece of scientific research and communicate the results. It culminates in the production of a thesis. Students are assigned to a member of staff who will support an appropriate topic and will supervise the work. They will submit a research proposal before the practical work begins. For the project, they will be expected to outline clearly a scientific problem, review the associated literature, design and execute an appropriate research programme, analyse and present the results and draw clear conclusions and record progress in a notebook (physical or

electronic as appropriate). Detailed guidance notes on writing and submitting the thesis and poster may be found on the FBU44000 Blackboard site.

Learning Outcomes:

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

1. Formulate scientific questions, apply a scientific approach to problem solving
2. Plan an investigation and utilise the principles of good experimental, observational or computational design
3. Conduct an in-depth scientific review of a subject
4. Organise desktop, computational, field- or laboratory-based research including: logistics, recording, archiving, qualitative or numerical analysis and presentation and interpretation of data
5. Manage a project through continuous assessment of progress and improvement of skills
6. Work effectively with a team including their supervisor and other members of the research team
7. Demonstrate technical competence in the handling of research facilities and operate safely in a computational, laboratory and/or field environment, both individually and as part of a team
8. Present and communicate their results in the form of a dissertation

Optional Modules

BOU44109: VEGETATION DESCRIPTION AND ANALYSIS

Course type: Optional

Coordinator: Professor Stephen Waldren

ECTS Credits: 5 Credits

Assessment: 100% Continuous assessment

Description:

This module will describe how to sample, record and lead up to detailed multivariate analyses to help define vegetation communities. Though some theoretical and historical framework will be given in lectures, the emphasis will be on practical collection, analysis and interpretation of vegetation data. Various data sets will be utilised in computer-based sessions, and field work will be used to generate a novel data set, the analysis and interpretation of which will form part of the continuous assessment for this module.

Learning Outcomes:

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

- Employ effective methods to collect vegetation data
- Understand the theory and practice of vegetation description
- Employ a variety of measures to describe plant diversity in sampled vegetation
- Use multivariate statistical techniques to develop hypotheses about vegetation communities

- Utilise remotely sensed data and GPS in the field to map vegetation communities.

BOU44107: PLANT-ANIMAL INTERACTIONS

Course type: Optional

Coordinator: Professor Jane Stout

ECTS Credits: 5 Credits

Assessment: 50% Continuous assessment, 50% Examination

Description:

In *The Origin of Species* (1859) Darwin emphasized that “plants and animals, most remote in the scale of nature, are bound together by a web of complex relations”. Plant-animal interactions have become increasingly recognized as drivers of evolutionary change and important components of ecological communities. This module will focus on pollination (the transfer of pollen between male and female reproductive structures in flowers) and herbivory (the consumption of plants by animals). The first half of the module will focus on plant-pollinator interactions, including pollinator-mediated evolution of floral traits, community level interactions, pollinator decline and conservation. The second part of the module will focus on antagonistic interactions between plants and herbivores, and explore plant and animal adaptations to herbivory, plant-herbivore dynamics and applications of interactions to ecosystem management. Practicals will investigate floral characteristics and adaptations for pollination, pollinator networks and plant and animal adaptations to herbivory.

The aims of the module are:

1. To promote your understanding of pure and applied ecology and evolution of plant-animal interactions
2. To equip you with the basic skills for carrying out laboratory and field experiments to examine plant-animal interactions.

Learning outcomes:

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

- Synthesise and summarise aspects of the ecology and evolution of mutualistic and antagonistic plant-animal interactions, from individuals to communities, interactions between native and alien species, and applied issues.
- Carry out laboratory work investigating pollination syndromes, plant-pollinator interaction networks and plant and animal adaptations to herbivory, and analyse and interpret data collected.
- Work as a team to obtain, organise and present material on current topics in the field.

ZOU44013: CONSERVATION AND WILDLIFE MANAGEMENT

Course type: Optional

Coordinator: Professor Ian Donohue

ECTS Credits: 5 Credits

Assessment: 50% Continuous assessment, 50% Examination

Description:

This module, which consists of both lectures and tutorials, looks at some of the practical applications of wildlife biology to the conservation and management of animals, both in- and ex-situ, including the role of zoos in captive breeding programmes.

Among the topics covered are:

- Planning for wildlife management.
- Wildlife survey and census techniques.
- The principles of managing wildlife for sustainable harvest or control.
- Management of scarce or endangered species.
- Practical issues associated with the ex-situ management of species.
- The design and management of conservation areas.

In the second part of the module, we will concentrate on anthropogenic impacts on biodiversity conservation, including the development and implementation of biodiversity conservation strategies in the wake of the Convention on Biological Diversity, other national and international wildlife legislation, biosecurity and the role of Invasive Alien Species, Biological Data Management and the development of Species Action Plans, and the role of reintroductions in biodiversity conservation.

Learning outcomes:

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

- Outline the goals and history of sustainable wildlife management.
- Determine and evaluate strategies for exploitation and control of animal resources.
- Implement techniques for establishing and maintaining the conservation status of species.
- Describe the relationship between in- and ex-situ conservation measures.
- Evaluate the selection, design and management of protected areas for wildlife.

BOU44103: PLANT CONSERVATION AND BIODIVERSITY

Course type: Optional

Coordinator: Professor Stephen Waldren

ECTS Credits: 5 Credits

Assessment: 50% Continuous assessment, 50% Examination

Description:

Loss of biodiversity is one of the major problems facing humanity. The theoretical background to the evolution of plant diversity is firstly developed, and the principles of conservation are then used to develop approaches to conserve plant diversity.

Learning outcomes:

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

- Identify key processes that lead to the development of higher plant diversity
- Explain how patterns of plant diversity have arisen
- Assemble, manipulate and critically analyse experimental data related to plant diversity
- Describe the processes that threaten plant diversity, and evaluate the degree of threat
- Evaluate national legislation and policy related to plant diversity and its conservation
- Evaluate global and national initiatives to conserve plant diversity.

ESU44054: SPATIAL ANALYSIS USING GIS

Course type: Optional

Coordinator: Professor Niamh Harty

ECTS Credits: 5 Credits

Assessment: 100% Continuous assessment

Description:

This module introduces students to the framework and methods used in real-life problems related to the field of Spatial Analysis by applying the theoretical knowledge gathered during the module to live project work. The module seeks to impart the necessary skills and knowledge to enable graduates to engage as team members and leaders in the types of large and complex sustainable environment projects that are increasingly being planned across the world. It aims to help fill a major and increasingly obvious skills gap. A unique feature of this module is the use of Dublin and Ireland as a learning laboratory, where the students will take responsibility of a project. The Spatial Analysis using GIS Module is designed to introduce the student to spatial analysis using the Geographic Information Systems (GIS) platform ArcGIS.

Learning Outcomes:

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

- Solve Spatial Analysis problems by applying interdisciplinary approaches.
- Discuss and debate solutions to problems in the environment.
- Communicate effectively in technical and scientific writing, and present scientific/technical ideas concisely to a technical audience that may not be expert in the specific domain of the presentation.
- Implement technical knowledge to address a spatial analysis problem.
- Identify and use appropriate mathematical methods, numerical techniques and GIS tools for application to new and ill-defined spatial analysis problems.
- Describe succinctly, the relevant advantages and disadvantages of various technologies to a lay audience, and to communicate effectively in public.

Requirements:

Students taking this module must have access to a computer (Windows or Mac) to be able to run QGIS 3.10 from home. They must also be able to join online practical sessions on Blackboard Collaborate with sound and video facilities.

GGU44927: ENVIRONMENTAL GOVERNANCE 2

Course type: Optional

Coordinator: Professor Rory Rowan

ECTS Credits: 5

Assessment: 100% Continuous assessment

Quota: 5 students only can be registered for this module

Description:

There is little disagreement that far-reaching societal, technological, political, and economic transformations are required if we are to avoid the worst effects of global, anthropogenic environmental change. What form these transformations should take and who should take responsibility for them are questions that are, however, far from settled.

This module considers some of the key conceptual debates and environmental conflicts arising in this context. Examination of these debates and conflicts will demonstrate the contested and uneven nature of environmental change and the measures sought to address these changes. The overall aim of the module is to help students develop a more nuanced, critical and multi-disciplinary understanding of environmental change and the different, often contested, ways of responding to such changes.

The module will consist of weekly interactive lectures/seminars, guest lectures, and set readings. Lectures will introduce students to key concepts and perspectives drawn from the broad field of political ecology. Each week part of the class will be set aside for students to develop their research projects. These projects will focus on a key area of environmental contestation in Ireland through a political ecology lens. The projects will involve group work and individual work, written assignments, oral presentations, and primary research. Class attendance is essential.

Learning outcomes:

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

- Understand and apply key theoretical concepts from the field of political ecology to contemporary environmental debates and issues;
- Identify and critically discuss key sites of environmental contestation in Ireland today;
- Explain why an in-depth understanding of environmental problems today requires an understanding of the political, economic and social contexts out of which they emerge and within which they are managed

Academic year structure 2020-2021

Academic Calendar Week	Week beginning	2020/21 Academic Year Calendar		Term / Semester
		UG continuing years / PG all years	UG new first years	
1	31-Aug-20	Marking/Results		←Michaelmas Term begins/Semester 1 begins
2	07-Sep-20			
3	14-Sep-20	Appeals		
4	21-Sep-20	Orientation (UG Visiting/Erasmus & PG)		
5	28-Sep-20	Teaching and Learning	Orientation (UG new first years)	←Michaelmas teaching term begins
6	05-Oct-20	Teaching and Learning	Teaching and Learning	
7	12-Oct-20	Teaching and Learning	Teaching and Learning	
8	19-Oct-20	Teaching and Learning	Teaching and Learning	
9	26-Oct-20	Teaching and Learning (Mon, Public Holiday)	Teaching and Learning (Mon, Public Hol)	
10	02-Nov-20	Teaching and Learning	Teaching and Learning	
11	09-Nov-20	Study/Review	Teaching and Learning	
12	16-Nov-20	Teaching and Learning	Teaching and Learning	
13	23-Nov-20	Teaching and Learning	Teaching and Learning	
14	30-Nov-20	Teaching and Learning	Teaching and Learning	
15	07-Dec-20	Teaching and Learning	Teaching and Learning	
16	14-Dec-20	Teaching and Learning	Teaching and Learning	←Michaelmas term ends Sunday 20 December 2020/Semester 1 ends
17	21-Dec-20	Christmas Period - College closed		
18	28-Dec-20	24 December 2020 to 3 January 2021 inclusive		
19	04-Jan-21	Revision	Revision	
20	11-Jan-21	Assessment*	Assessment*	←Hilary Term begins
21	18-Jan-21	Assessment*/ Foundation Scholarship^	Assessment*	
22	25-Jan-21	Marking/Results	Marking/Results	
23	01-Feb-21	Teaching and Learning	Teaching and Learning	←Hilary teaching term begins /Semester 2 begins
24	08-Feb-21	Teaching and Learning	Teaching and Learning	
25	15-Feb-21	Teaching and Learning	Teaching and Learning	
26	22-Feb-21	Teaching and Learning	Teaching and Learning	
27	01-Mar-21	Teaching and Learning	Teaching and Learning	
28	08-Mar-21	Teaching and Learning	Teaching and Learning	
29	15-Mar-21	Study/Review (Wed, Public Holiday)	Study/Review (Wed, Public Holiday)	
30	22-Mar-21	Teaching and Learning	Teaching and Learning	←Hilary Term ends Sunday 25 April 2021
31	29-Mar-21	Teaching and Learning (Fri, Good Friday)	Teaching and Learning (Fri, Good Friday)	
32	05-Apr-21	Teaching and Learning (Mon, Easter Monday)	Teaching and Learning (Mon, Easter Monday)	
33	12-Apr-21	Teaching and Learning	Teaching and Learning	
34	19-Apr-21	Teaching and Learning	Teaching and Learning	
35	26-Apr-21	Trinity Week (Mon, Trinity Monday)	Trinity Week (Mon, Trinity Monday)	←Trinity Term begins
36	03-May-21	Revision (Mon, Public Holiday)	Revision (Mon, Public Holiday)	
37	10-May-21	Assessment*	Assessment*	←Statutory (Trinity) Term ends Sunday 6 June 2021/Semester 2 ends
38	17-May-21	Assessment*	Assessment*	
39	24-May-21	Marking/Results	Marking/Results	
40	31-May-21	Marking/Results	Marking/Results	
41	07-Jun-21	Research (Mon, Public Holiday)	Research (Mon, Public Holiday)	
42	14-Jun-21	Research	Research	
43	21-Jun-21	Research	Research	
44	28-Jun-21	Research	Research	
45	05-Jul-21	Research	Research	
46	12-Jul-21	Research	Research	
47	19-Jul-21	Research	Research	
48	26-Jul-21	Research	Research	
49	02-Aug-21	Research (Mon, Public Holiday)	Research (Mon, Public Holiday)	
50	09-Aug-21	Research	Research	
51	16-Aug-21	Research	Research	
52	23-Aug-21	Research	Research	

* Note: additional/contingency days may be required outside of the formal assessment/reassessment weeks.

^ Note: It may be necessary to hold some exams in the preceding week.

The Academic Year Calendar 2020/2021 can be viewed at

<https://www.tcd.ie/calendar/academic-year-structure/academic-year-structure.pdf>

Assessment and Examinations

Examination dates

- Semester 1 assessment dates commence the week beginning Monday 11th January 2021.
- Semester 2 assessment dates commence the week beginning Monday 10th May 2021.

External Examiner

An external examiner, currently Professor Guy Woodward from Imperial College London (<https://www.imperial.ac.uk/people/guy.woodward>) moderates the Senior Sophister examinations. It is common practice for external examiners to viva students following the completion of their final examinations. The viva timetable will be available during the examinations.

Module assessment

Junior Sophister modules are assessed by in-course continuous assessment and/or examination. Please note that twenty per cent of the Senior Sophister overall mark is currently carried forward from the Junior Sophister year.

Senior Sophister modules are also assessed by in-course continuous assessment and/or examination. Your final degree classification is based on a combination of marks including, continuous assessment, examinations and the submission of a thesis associated with the research project (FBU44000) and examinations.

You should take care not to engage in plagiarism when completing all assessment exercises: for instance colluding with others to complete a word-processed practical report would be plagiarism unless approval had been sought in advance from the relevant lecturer. For further details it is advised that all students consult the College policy dealing with plagiarism (see section on plagiarism below).

You must indicate on any practical write-ups the name of your Partner(s) and his/her ID number(s).

Submission of continuous assessment material

To avoid any misunderstandings arising in relation to submitting continuous assessments please adhere to the following points as they are absolute:

- In accordance with college policy, all assessments must be submitted via Blackboard. Where this is not possible assignments must be submitted at the appropriate location (usually either the Botany or Zoology Offices, depending upon the module) before the set deadline. Students need to sign-off at the time of submission.
- Assessments left in staff pigeonholes, or handed to other members of staff will not be marked.
- For late submissions there will be a deduction of 5% per day, including weekends. Submissions received more than three days late, without a medical certificate, will not be marked. **ALL LATE SUBMISSIONS MUST BE HANDED IN**

DIRECTLY TO THE RELEVANT OFFICE TO THE EXECUTIVE OFFICER TO BE DATE STAMPED.

- Any alternative arrangements must be approved by the staff member responsible for the assessment, and the relevant Executive Officer notified.
- Please remember it is important to keep all Continuous Assessment exercises when returned to you, until the Court of Examiners has awarded your final mark.

Plagiarism

To ensure that you have a clear understanding of what plagiarism is, how Trinity deals with cases of plagiarism, and how to avoid it, you will find a repository of information at <http://tcd-ie.libguides.com/plagiarism>.

We ask you to take the following steps:

- (i) Visit the online resources to inform yourself about how Trinity deals with plagiarism and how you can avoid it at <http://tcd-ie.libguides.com/plagiarism>. You should also familiarize yourself with the 2015-16 Calendar entry on plagiarism located on this website and the sanctions which are applied.
- (ii) Complete the 'Ready, Steady, Write' online tutorial on plagiarism at <http://tcd-ie.libguides.com/plagiarism/ready-steady-write>. Completing the tutorial is compulsory for all students.
- (iii) Familiarise yourself with the declaration that you will be asked to sign when submitting course work at <http://tcd-ie.libguides.com/plagiarism/declaration>.
- (iv) Contact your College Tutor, your Course Director, or your Lecturer if you are unsure about any aspect of plagiarism.

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 research subjects and populations should be treated fairly and equally)."

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 natural or man-made habitats commence. This requirement applies to staff, postgraduate and undergraduate students and volunteers/interns. Field- and laboratory work cannot commence until review has been completed and/or approval has been gained.

STUDENTS PLANNING TO UNDERTAKE RESEARCH SHOULD COMPLETE THE SNS
Research Ethics Application.

For further details please follow this link: www.naturalscience.tcd.ie/research/ethics

Sophister Essay & Examination Marking Guide

Class	Mark Range	Criteria
I	90-100	EXCEPTIONAL ANSWER; 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	OUTSTANDING ANSWER; 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	INSIGHTFUL ANSWER; 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	VERY COMPREHENSIVE ANSWER; good understanding of concepts supported by broad knowledge of subject. Notable for 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	LESS COMPREHENSIVE ANSWER; mostly confined to good recall of module work. Some 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	SOUND BUT INCOMPLETE ANSWER; 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.
	50-54	INCOMPLETE ANSWER; suffers from significant omissions, errors and misunderstandings, but still with understanding of main concepts and showing sound knowledge. Several lapses in detail.
III	45-49	WEAK ANSWER; limited understanding and knowledge of subject. Serious omissions, errors and misunderstandings, so that answer is no more than adequate.
	40-44	VERY WEAK ANSWER; 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	MARGINAL FAIL; inadequate answer, with no substance or understanding, but with a vague knowledge relevant to the question.
F-2	0-29	UTTER FAILURE; with little hint of knowledge. Errors serious and absurd. Could also be a trivial response to the misinterpretation of a question.
U.G		Ungraded

Sophister Project & Thesis Marking Guide

Class	Mark Range	Criteria
I	80-100	Exceptional project report showing deep understanding of the topic and literature similar to that expected in a published paper. Clear grasp and expression of the justification for the research, with clear explanation of the importance and implications of the work within the subject area. Methods described with the clarity and detail expected in a published paper, showing sound experimental design. Excellent presentation, analysis and exploration of results focussed on the question asked, using the most appropriate analyses for the question and data. Thoughtful, critical evaluation of the findings, discussed insightfully in their full context within the literature. Excellent presentation of the finished thesis, which contains very few, if any editorial errors.
	70-79	A very good project report showing evidence of wide reading, with clear presentation and thorough analysis of results and an ability to critically evaluate and discuss research findings. Clear indication of some insight and originality. A very competent and well-presented report overall but falling short of excellence in each and every aspect.
II-1	65-69	A very good project report, showing a reasonably wide understanding of the topic and its associated literature, with some indication of how the research adds to the field. Methods described clearly and in sufficient detail for someone to repeat the work, and showing sound experimental design, or the appreciation of how it could have been made sound. Competent analysis of the results and valid and accurate interpretation of the findings. Results presented accurately using appropriate figures and/or tables. Accurate appreciation of any shortcomings of the experimental design and the implications for interpretation. Discussion of the results puts them into some level of context but may not reflect all the implications for the research field.

	60-64	A good project report, showing some understanding of the wider topic and its associated literature, with some indication of the relevance of the research. Methods described clearly, though perhaps not in sufficient detail for someone else to repeat the work. Sound experimental design, or some appreciation of how it could have been made sound. Competent analysis of the results, though perhaps through the use of simpler tests than would be ideal. Accurate presentation of results, though perhaps not with the best choice of graphics. Interpretation of findings mostly valid and accurate. Some appreciation of any major shortcomings in experimental design and the implications for interpretation. Discussion may focus mostly on the findings, with only occasional references to other work, though those contextual references should be present.
II-2	50-59	A moderately weak project report which shows some understanding of the research question, but lacks a strong grasp of the wider research topic or the relevance of the project. Methods mostly described clearly, but there may be lapses in detail. Experimental design may not be entirely sound, and any weakness may be undescribed. Analysis of the results generally sound but may be simple and contain errors such as incorrect statistical reporting or the use of less than ideal graphs. Interpretation of the findings may not be entirely accurate, and shortcomings in the design or analysis unlikely to be taken into account during interpretation, but some level of interpretation of the results must be present. Discussion may focus solely on the findings of the work, and may lack references to other work, though some indication of the relevance of the project should be present. Insufficient attention paid to organisation and presentation of the report.
III	40-49	A weak project showing only limited understanding of the research question, reported without understanding of the wider context or relevance of the project. Methods not complete. Experimental design may contain obvious unrecognised flaws and may not be described completely. Analysis of results simple and may show basic errors. Interpretation of results may be limited or absent. Discussion may be minimal and restricted to the direct findings of the project. General standard of presentation poor.

Fail	20-39	An unsatisfactory or incomplete project report, lacking sections or with little content in some. Very limited understanding of the question or failure to express it at all. Methods may be incomplete, possibly lacking description of experimental design. Results may be incomplete, with poor choice of graphics and / or tables. Analysis of data may be lacking or contain fundamental errors. Interpretation of the results likely to be limited or absent. Discussion restricted to a restatement of results. Very poor overall standard of presentation.
	0-19	An extremely poor project report containing very little substance and showing no real understanding or awareness of the problem. No attempt at a relevant literature review or relevant support from published work. Methods chaotic or incomprehensible. Almost absent or completely absent presentation of results. Any analysis of results incorrect or inappropriate. Clear inability to interpret results in relation to other work or ideas. Very poor overall standard of presentation.

Academic and Personal Issues

Academic Issues

If you experience any academic problems, below are some sources of assistance:

- Module Lecturer and/or coordinator
- Course Advisor
- Class representatives
- Head of Discipline
- Personal tutor (or any other tutor if you cannot find yours)
- Senior Tutor
- Head of School
- Director of Teaching and Learning (Undergraduate)
- Students' Union Education Officer, (01) 646 8439, Email: education@tcdsu.org

Personal Issues

If you experience any personal problems, below are some sources of assistance:

- Personal tutor (or any other tutor if you cannot find yours)
- Senior Tutor (stosec@tcd.ie)
- Student Counselling Service, 199/200 Pearse Street, College, Email: student-counselling@tcd.ie; (01) 896 1407
- Niteline: (Thursdays to Sundays during term only, 9pm - 2.30am) at 1800 793 793
- Student Health Service, House 47 - Medical Director: Dr David McGrath 01 896 1556; Doctors: Dr Mary Sheridan, Dr Aisling Waters, Dr Niamh Murphy 896 1556; Nurse: Ms Carmel Conway 01 896 1556; Health Promotion Officer:

Ms Martina Mullin 01 896 1556; Physiotherapist: Ms Karita Cullen 01 896 1591;

- Welfare Officer, Students' Union, House 6, College (01) 646 8437, Email: welfare@tcdsu.org
- Chaplains; House 27, College: Alan O'Sullivan (Roman Catholic) 896 1260; Hilary Dungan (Church of Ireland) 01 896 1402; Julian Hamilton (Presbyterian) 896 1901; Peter Sexton (Roman Catholic) 01 896 1260
- Disability Services, Mr Declan Treanor, Room 3055, Arts Building (01 896 3111), Email: disab@tcd.ie
- Any student, member of staff or other person with whom you feel able to discuss your problems

Health and Safety

LEGAL BACKGROUND

The University must exercise a "duty of care" to employees and those they supervise. This duty of care is recognised in both criminal and civil law. There is also a duty on everybody to take reasonable care for their own safety and the safety of those around them.

DISCIPLINE SAFETY OFFICERS

Botany - Botany Building , Anatomy Building & Dartry Gardens – Siobhan MacNamee, Siobhan.McNamee@tcd.ie

Environmental Science - Anatomy Building – Mark Kavanagh, kavanamg@tcd.ie

Geography - Museum Building – Terence Dunne, Terence.Dunne@tcd.ie

Geology - Museum Building, TTech Pearse St. – Cora McKenna, mckennc6@tcd.ie

Zoology – Zoology Building – Alison Boyce, aboyce@tcd.ie

CONTRIBUTING DEPARTMENTS

Each of the four disciplines that comprise the School of Natural Sciences (i.e. Botany, Geography, Geology and Zoology) contribute courses to the Environmental Science Moderatorship. Courses will be run in the lecture and laboratory facilities in each Department building. You must make yourself aware of the safety regulations and house rules for each department. You should also become familiar with the department resources available to you, such as libraries, museums and IT facilities. Information can be found on each department web site or by contacting the Chief Technical Officer or Executive Officer.

THE LABORATORY

In formal laboratory exercises will have been risk assessed. You will be under supervision in a controlled environment where all reasonable safety precautions have been considered and all hazards identified. .You have a legal obligation to follow the instructions of those in control of the laboratory. You have a duty of care for yourselves and those who may be affected by your actions. This means that your behaviour in the laboratory must be such that you do nothing to place either yourself or other laboratory users at risk. If you do not understand any instructions you **must alert those in control.**

Instrumentation in a laboratory is an area of high risk. If you have not used an instrument before you will not know the potential dangers it may pose. Do not interfere with any piece of equipment or use it without prior instruction. The staff, both academic and technical, along with the demonstrators, are available to instruct you so always ask to be taken through the use and dangers of any piece of equipment which you have to use.

FIELDWORK

Fieldwork is defined as any practical work carried out in the field by staff or students of the University for the purpose of teaching and/or research. By definition it occurs in places which are not under the control of the University, but where the University is responsible for the safety of its staff and students.

Please note:

Voluntary and Leisure activities are excluded.

Outside of Voluntary and Leisure activities, the Head of Discipline has overall responsibility for health and safety in their area. They are required to ensure that the risk assessment of the fieldwork is made and to ensure that a safe system of work has been established for all staff and students. This duty is frequently delegated to the member of staff organising the fieldwork. The Head of Discipline must ensure that the fieldwork meets the safety criteria of the School, and that accidents are reported and investigated. There is a Department Safety Officer, who is responsible for day-to-day safety matters.

There is a duty on the fieldwork participants to take reasonable care for their own safety and the safety of those affected by them.

Some staff and students may be unable to carry out certain types of fieldwork due to any number of physical or medical conditions and early identification of such problems is essential.

There are a number of forms that must be completed before Laboratory or Fieldwork is begun. Please note that it is compulsory for each student to fill these forms in prior to beginning fieldwork. These may include Health Declaration Forms, Code of Conduct Agreement and Risk Assessment. The forms must be returned to the relevant Discipline Safety Officer.

Relevant and suitable protective equipment must be worn. Participants must dress appropriately especially in cold and wet conditions. When the activity involves the use of boats other than registered ferries appropriate life jackets must be worn.

The School of Natural Sciences has prepared a detailed set of instructions relating to field-work. Available at:

<http://www.naturalscience.tcd.ie/healthsafety/>

FIRE

Fire Prevention

Copies of the College General Fire Notice are displayed in all Departments. Familiarise yourself with the instructions in case of fire. Any defect or potential fire hazards should be reported to the building Fire Warden.

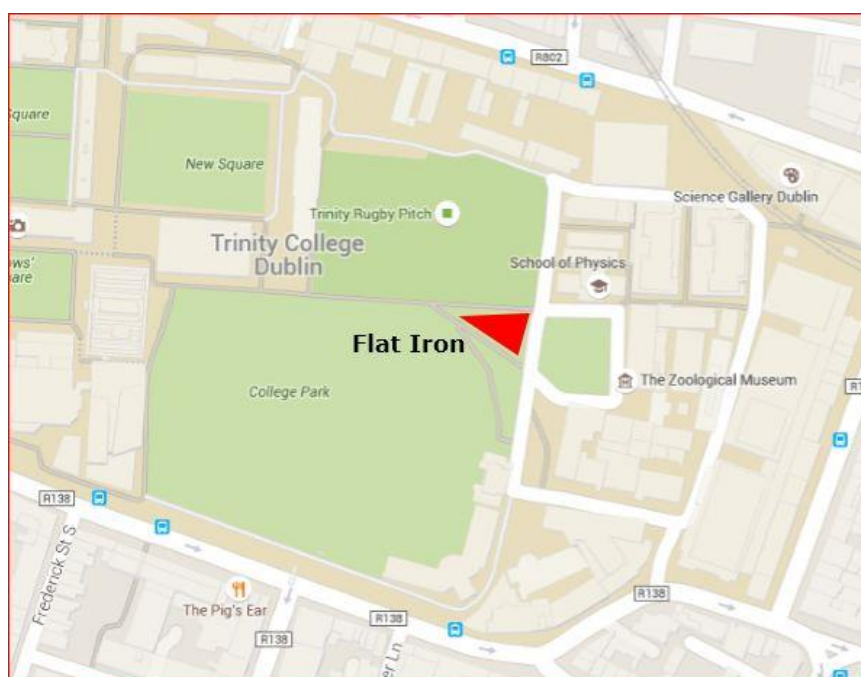
Note the position of fire extinguishers in your working area. Please note you are not permitted to use a fire extinguisher unless you have attended the College's training course.

Before leaving offices or laboratories:-

- ensure that all litter bins do not contain any smouldering materials.
- do not leave litterbins under or near to any combustible items e.g. desks, tables, shelving etc.
- close all filing cabinets and presses.
- switch off and unplug electrical equipment not in use.

In Case of Fire

- There is a fire alarm system in the buildings controlled by all Disciplines. If the alarm bells ring or someone shouts 'fire', all persons in the building must exit as rapidly as possible and assemble at the appropriate assembly point For Botany, Zoology and Centre for the Environment this is located at the Grass triangle ('Flat Iron') at east end of Boardwalk (College Park), designated Fire Point D:



At the assembly point organise yourselves into laboratory or functional groups and the senior person present must take a roll-call. Missing persons must be reported immediately.

Inform the Front Gate Security Officer, emergency no. ext: 1999 (01 896 1999 from mobile) or the 24 hour security no. ext: 1317 (01 896 1317), who will call the fire brigade.

BOMBS/HOAX BOMB CALLS/BOMB WARNINGS

Keep an eye out for suspicious packages at all times. If one is observed report it to the Chief Technical Officer or another staff member. If a bomb is thought to be in the building, procedures essentially follow those employed in the case of fire. Report to College authorities on ext: 1999/1317 (Front Gate Security Officer & 24 hour Security) who will call the Gardaí.

FIRST AID

First Aid boxes are placed in every laboratory. These boxes contain a range of dressings and bandages for treatment of minor cuts and burns. DO NOT USE AN ITEM WITHOUT SUBSEQUENTLY INFORMING A TECHNICAL OFFICER. This ensures the incident is recorded and the items used are replaced. A list of trained First Aiders is displayed on each first aid cabinet.

REPORT ANY DEFICIENCY OF THE ITEMS IN OR ON THE BOX TO THE RELEVANT CHIEF TECHNICAL OFFICER.

All accidents must be reported to the Safety Officer and entered in the accident book. An accident report form will be completed. Dangerous occurrences (near misses) must also be reported on the appropriate form.

In the event of serious accident or medical emergency requiring the emergency services, quickly report it to the Chief Technical Officer in that building or the senior person present, then call the Front Gate Security Officer ext: 1999/1317 During office hours minor medical assistance can be obtained from the Student Health Service ext: 1556/1591

First Aid may only be carried out by a trained first aid responder. In the field, all staff and demonstrators carry an individual first aid kit. Departmental vehicles carry a more extensive kit. Report all field injuries or illness immediately to the leader of the field trip. You must always adhere to the instructions and directions of the field-leader.

General Information

Central Societies Committee <http://trinitysocieties.ie/>

TCD Environmental Science Society <http://trinitysocieties.ie/society/?socid=34>
& Facebook group <https://www.facebook.com/TCDEnvironmentalSociety/>

Dublin University Central Athletics Club DUCAC
http://www.tcd.ie/Sport/student-sport/ducac/?nodeId=94&title=Sports_Clubs

Trinity College Students Union <https://www.tcdsu.org/>

Trinity College Graduate Students Union <https://www.tcdgsu.ie/>

Key Locations

Academic Registry <https://www.tcd.ie/academicregistry/>

TCD Portal my.tcd.ie

Blackboard <https://tcd.blackboard.com/webapps/login/>

Staff Contacts

Staff	Office location	Ext	Email
<i>Teaching staff</i>			
Prof Yvonne Buckley	Zoology Building	3172	buckleyy@tcd.ie
Prof Marcus Collier	Centre for the Environment	1641	colliema@tcd.ie
Prof Catherine Coxon	Centre for the Environment	2235	cecoxon@tcd.ie
Prof Ian Donohue	Zoology Building	1356	ian.donohue@tcd.ie
Prof Robbie Goodhue	Museum Building	1419	goodhuer@tcd.ie
Prof Niamh Harty	Civil Engineering	1302	Niamh.Harty@tcd.ie
Prof Celia Holland	Zoology Building	1096	cholland@tcd.ie
Prof Andrew Jackson	Zoology Building	2278	jackson@tcd.ie
Prof Pepijn Lujckx	Zoology Building	1926	luijckxp@tcd.ie
Prof Nicola Marples	Zoology Building	2527	nmarples@tcd.ie
Prof Jennifer McElwain	Botany Building	2294	jmcelwai@tcd.ie
Prof Fraser Mitchell	Botany Building	1811	fmitchll@tcd.ie
Prof Jeremy Piggott	Zoology Building	1642	Jeremy.Piggott@tcd.ie
Prof John Rochford	Zoology Building	2237	rchfordj@tcd.ie
Prof Rory Rowan	Museum Building		rowanro@tcd.ie
Prof Matthew Saunders	Botany Building	4870	saundem@tcd.ie
Prof Jane Stout	Botany Building	3761	jane.stout@tcd.ie
Prof Steve Waldren	Trinity Botanic Gardens, Dartry	5117	swaldren@tcd.ie
Prof Mike Williams	Botany Building	2421	willism@tcd.ie
<i>Technical Staff</i>			
Ms Patricia Coughlan	Botany Building	1275	coughlp@tcd.ie
Mr Mark Kavanagh	Centre for the Environment	1017	kavanamg@tcd.ie
Ms Siobhan McNamee	Botany Building	1309	smcnamee@tcd.ie
Ms Jackie Stone	Centre for the Environment	1275	jstone@tcd.ie
Dr Martyn Linnie	Zoology Building	1679	mlinnie@tcd.ie
Ms Alison Boyce	Zoology Building	3506	aboyce@tcd.ie

Ms Sinead Kelly	Zoology Building	3506	kellys76@tcd.ie
<i>Executive Officers</i>			
Ms Mandy Lockhart	Undergraduate Teaching Office, Room 0.2, Botany Building	1274	ZOBOES@tcd.ie
Ms Fiona Moloney	Undergraduate Teaching Office, Zoology Building	1366	ZOBOES@tcd.ie