

BIOL215 Exploring Biodiversity: Principles and Methods of Systematics

***Whakamahuki* / Course description**

This course takes a broad view of the ways biological diversity can be described and classified, and its origins understood. Systematics is the scientific discipline that encompasses the description, identification, nomenclature, and classification of organisms (Taxonomy) and the reconstruction of their macro-evolutionary history (Phylogenetics). Knowing the identity and evolutionary relationships of organisms is crucial to any biological study, but functional classifications are also important. This course is an introduction to the methodology and principles of systematics across all forms of biodiversity (including bacteria, plants, fungi, protists, and animals), from morphological to next-generation DNA-based approaches and including functional methods.

Who is this course intended for?

BIOL215 is targeted at students with a broad interest in the evolution, ecology, and biodiversity of a wide range of taxonomic groups. It is developed to be a core element of the 'Molecular/Micro Biology & Systematics' and 'Ecology, Evolution & Behaviour' themes of the Biological Sciences Major. It is a prerequisite course for BIOL305 Practical Field Botany and BIOL334 Evolutionary Genetics and Genomics and also provides skills relevant to microbiology and conservation.

***Kairuruku akoranga* / Course coordinator**

- Dr. Pieter Pelsner, Von Haast 530; pieter.pelsner@canterbury.ac.nz

***Pūkenga* / Lecturer**

- Dr. Craig Herbold, Von Haast 532; craig.herbold@canterbury.ac.nz

***Āhuatanga Taura* / Graduate Profile**

This course will provide students with an opportunity to develop these UC Graduate Attributes (GP) and Kaupapa (K) (www.canterbury.ac.nz/study/graduate-profile/students/what-are-the-graduate-attributes/):

- GP1 Critically competent in a core academic discipline.
- GP2 Employable, innovative and enterprising.
- GP3 Biculturally competent and confident: K1 A process of self-reflection on the nature of 'knowledge' and 'norms' K6 Other indigenous models of development, knowledge and behaviours.
- GP5 Globally aware

Hua akoranga / Intended learning outcomes and Aromatawai /Associated assessment

As a student in this course, I will develop the ability to:

- Explain the relevance to biological sciences and society of 1) discovering and documenting biodiversity, 2) taxonomic classifications, and 3) knowledge about evolutionary history and relationships (*assessment tasks: mid-course test, final exam; GP3: K1&6, GP5*)
- Understand key methods and principles of biological classification and nomenclature (*assessment tasks: mid-course test, final exam; GP1*)
- Collect, document, and describe biological specimens (*assessment tasks: lab reports; GP1&2*)
- Use a wide range of taxonomic identification tools including morphological analysis and DNA sequences (*assessment tasks: mid-course test, lab reports, final exam; GP2*)
- Generate DNA sequence data from soil, plant, and fungal specimens (*assessment tasks: lab reports; GP1&2*)
- Test phylogenetic hypotheses using DNA sequence data (*assessment tasks: lab reports; GP1&2*)
- Use a metabarcoding approach to investigate species distributions (*assessment tasks: mid-course test, lab reports, final exam; GP1&2*)
- Write clear and concise scientific reports that effectively communicate the aims, methods, results, and conclusions of a study in the field of Systematics, including appropriate use of figures, tables, and citations (*assessment tasks: lab reports; GP1&2*)

Pūkenga ngaio / Transferable skills

As a student in this course, I will develop the following skills:

- Morphological and genetic identification skills used for plants, fungi, and bacteria. Essential in organismal biology, microbiology, ecology, conservation, taxonomy, and biosecurity (GP1&2).
- Work safely in a molecular lab and comply with PC2 containment regulations. Important for careers that include lab work (GP2).
- Molecular genetic laboratory skills. Important for careers that include lab work (GP2).
- Interpretation of phylogenetic trees and reconstructing evolutionary relationships. Important in fields of evolutionary biology such as genetics, bioinformatics, systematics, molecular ecology, microbiology (GP2).
- Use of biological classifications and scientific names. Essential skill in any field in biology and conservation (GP1&2).
- Independent and self-motivated learning. A life-skill that is important in any career. (GP2).
- Finding, understanding, and using information in literature and on the internet. These are very general skills that are essential in many careers (GP2).
- Written communication. Many employers require employees to have good communication skills (GP2).

Aromatawai / Assessment:

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| Pre-requisite knowledge test | 5% |
| Mini-lab reports | 15% |
| Completion of lab projects (pass/fail) | 5% |

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| Lab project report | 20% |
| Mid-course test | 20% |
| Final exam | 35% |

To achieve a passing grade in this course, you must achieve:

-An average of at least 40% for the mini-lab reports, completion of lab projects, and the project report AND

-An average of at least 40% for the prerequisite test, the mid-course test and the final exam AND

-A total course average of at least 50%.

If you fail to achieve the 40% minimum requirements, a grade of D (or E) will be awarded, even if your total score is greater than 50%. See below for more details and grade boundaries.

Notes:

- You will be expected to have access to one of the following text books:
 - Clark, M. A., J. Choi, and M. Douglas. 2020. Biology 2e. OpenStax.
 - Biology: A Global Approach, Global Edition, 12th edition. Neil A. Campbell, Lisa A. Urry, Michael L. Cain, Steven A. Wasserman, Peter V. Minorsky and Jane B. Reece.
 - Campbell Biology, Australian and New Zealand Edition, 12th edition. Lisa A. Urry, Noel Meyers, Michael L. Cain, Michael L. Cain, Steven A. Wasserman, Peter V. Minorsky, Rebecca Orr, Karen Burke Da Silva, Ann Parkinson, Lesley Lluaka, Prasad Chunduri.
- Please note that attendance of all laboratories and tutorials is compulsory. Because of practical constraints, labs cannot be made up for when missed. Lecture attendance is also expected.
- Be advised that you will need to bring the following to labs 1-4:
 - Safety glasses
 - Lab coat
- You will also need to bring a notebook, pen, pencil, and eraser with you to the labs and tutorial.
- Students should note that the average student is responsible for approx. 4.5 hours of additional study for each hour of lecture at the 200-level.

RULES, REGULATIONS, AND WHAT TO DO WHEN THINGS GO WRONG

[updated March 2023]

If in doubt: ASK! The course coordinator is happy to answer questions. All staff involved in the course are available for advice on specific issues.

What do I do if I have to miss a test/exam or if my performance was impaired?

In Biological Sciences, we require a satisfactory level of achievement in both the theoretical aspects of the discipline and in practical activities. **This means you must attend all class activities (labs, tutorials, fieldtrips)** and submit all items of assessment unless you have a very good reason not to (e.g. medical reasons) and if this has been approved by your course coordinator.

If you feel that **illness, injury, bereavement or other extenuating circumstances beyond your control** prevented you from completing a **test/exam** worth 10% or more of the total course assessment, or if these circumstances affected your performance in such assessments, you should apply for Special Consideration. Applications for Special Consideration should be submitted via the Special Consideration website <http://www.canterbury.ac.nz/study/special-consideration/> *within five working days* of the assessment or its due date. You should also notify the course coordinator. If you apply for Special Consideration because of medical reasons, you should visit a doctor within a reasonable timeframe (application form available on the website above or from the Student Health Centre).

The Special Consideration provisions are intended to assist students who have covered the work of a course but have been prevented by illness or other critical circumstances from demonstrating their mastery of the material or skills at the time of a test/exam – **they do not excuse you from doing the test/exam** within a reasonable time agreed with the course coordinator.

What do I do if I have to miss a quiz or assignment or if I need an extension?

You cannot apply for Special Consideration if you miss an assessment that is not a test/exam, such as a quiz, lab report, essay, literature review or other assignment, or if the test/exam is worth less than 10% or more of the total course assessment. If this happens or if you need an extension because of **illness, injury, bereavement or other extenuating circumstances beyond your control**, please contact the course coordinator and arrange an alternate activity and/or submission date. You should also do this if you have to miss a laboratory, tutorial or field trip.

What are other valid reasons to miss an assessment or mandatory course activity?

The Special Considerations policy (<https://www.canterbury.ac.nz/about/governance/ucpolicy/student/special-consideration-procedures-and-guidelines/>) outlines only a few kinds of activities that UC considers valid reasons for missing an assessment or mandatory course activity other than those outlined above. These include **involvement in international or national representative sport or cultural groups**. Holiday trips, birthday parties, weddings, work-related commitments etc. are not given special status in this University policy. Please contact your course coordinator to ask for an alternate activity and/or submission date if you are eligible.

Special Consideration for late discontinuation of a course

Students prevented by **extenuating circumstances** from completing the course after the final date for withdrawing, may apply for Special Consideration for late discontinuation of the course. Applications must be submitted via <http://www.canterbury.ac.nz/study/special-consideration/> no later than five working days after the examination period has finished.

Academic Integrity

It is the responsibility of each student to be familiar with the definitions, policies and procedures concerning academic misconduct/dishonest behaviour. Instances of academic misconduct will be dealt with in a serious and appropriate manner. Students should refer to: <https://www.canterbury.ac.nz/about/ako/academic-quality/academic-integrity/>

Plagiarism

It is essential that you are aware that plagiarism is considered a very serious offence by the academic community, the University and the School of Biological Sciences. Plagiarism is defined as taking content from another work or author and presenting it, without attribution, as if it is your own work. Content here includes text (sentences or major parts of sentences), display items (graphs and tables), and overall structure (the detailed sequence of ideas). Plagiarism includes:

- re-use of previous assignments (even if each individual sentence has been rephrased to say the same thing in different words, if the overall structure is re-used).
- copying of another student's work (with or without their consent).
- the unreferenced use of published material or material from the internet, e.g. cutting and pasting of paragraphs or pages into an essay.

- the generation of text using artificial intelligence technology without disclosure and when it is not intended to be part of an assignment.

For most pieces of in-term assessment you will be given information concerning the use of direct and indirect quotes from previously published work. If you have any doubt about the appropriate use of published material, please speak with an academic staff member. If you are unsure what plagiarism is, seek advice.

It is a School policy that courses will likely that you submit work electronically for subsequent analysis of originality using *Turnitin*. Students agree that by taking courses in BIOL, assessments may be submitted to Turnitin.com for textual similarity review. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of the Turnitin.com service is subject to the Terms and Conditions of Use as posted on the Turnitin.com site.

Where do I hand in assignments and then collect them once marked?

All assignments should be submitted as directed by the course coordinator. Typically, this will be electronically via Learn for on-line grading and for analysis in *Turnitin*. If a hard copy is requested, assignments should be placed in the designated collection boxes in the foyer of the 2nd floor of the School of Biological Sciences (Julius von Haast building, at the top of the stairs). All assignments must be accompanied by a cover sheet signed by you stating that the submitted work is not plagiarised. Cover sheets are available on top of the collection boxes, or you can download one from the Biology website (<http://www.canterbury.ac.nz/media/documents/science-documents/assignment-coversheet.pdf>).

Marked assignments will be returned through Learn or, if in hard copy, can be collected from the School of Biological Sciences reception, unless directed otherwise by the course coordinator. Teaching staff will endeavour to return work as soon as possible, and should contact you if there are likely to be any delays that will prevent return within the maximum 4-week timeframe.

What if I can't get it finished in time?

Reports and assignments should be handed in on time. Extensions may be granted if you have a valid reason (see above). **If you require an extension, you should request one from the course coordinator** (or the lecturer responsible for marking the work), with as much notice as possible. Please do this BEFORE the deadline for the assignment. **If you have been given an extension and you have been asked to submit a hard-copy of your work, you should hand the work DIRECTLY to the course coordinator** (do not put it in the drop box as it may not be cleared after the due date).

If an extension has not been granted:

- work handed in within 1 hour of the deadline: penalty of up to 5 percentage points of the mark for the assignment (e.g., a mark of 75% might be reduced to 70%).
- work handed in 1 – 24 hours after the deadline: penalty of 10 percentage points of the mark for the assignment (e.g., a mark of 75% is reduced to 65%).
- work handed in 1 – 7 days after the deadline: penalty of 15 percentage points of the mark for the assignment (e.g., a mark of 75% is reduced to 60%).
- work handed in more than 7 days after the deadline will not be marked or earn credit.

What if I have written more than the word or page limit?

If there is a word limit on an assignment, it is usually there to stop you doing too much work and to encourage you to write succinctly. You can be up to 10% over without too much worry, but if the length increases beyond that your mark may suffer due to failure to follow the requirements. If you find yourself way over the word limit talk to the lecturer concerned about how to get your assignment to an acceptable length. Unless specifically advised that there is flexibility, you must adhere to the word limit indicated.

What if I fail part of the course?

In Biological Sciences, we require a satisfactory level of achievement in both the theoretical aspects of the discipline and in practical activities. This means you must attend all class activities and submit all items of assessment unless you have a very good reason not to (e.g. medical reasons). **A student must attain an average score of at least 40% for in-course assessments (e.g. assignments, reports, quizzes) and an average score of at least 40% in the exam and/or tests, AND score at least 50% overall for the course, to be awarded a passing grade. See the course outlines for clarification of the assessment items included in each category and ask the coordinator if you are still unsure.**

What's the best way to give feedback?

We welcome constructive feedback at all times – help us to make this a valuable course for you. We endeavour to remain approachable at all times. If you would rather give feedback anonymously, please use the online course survey or talk to lab demonstrators, or your class rep (who will all report back to the staff-student liaison committee that includes a representative from each of the undergraduate classes). Class representatives will be selected from each class at the start of course.

What's the best way to complain?

If you feel you have not been fairly treated during this course, please raise the issue with the lecturer or course coordinator in the first instance. Other avenues include your class rep., who can raise issues anonymously, or the UCSA education coordinator.

Grading

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| A+ | 90% or above |
| A | 85 – 90 |
| A- | 80 – 84 |
| B+ | 75 – 79 |
| B | 70 – 74 |
| B- | 65 – 69 |
| C+ | 60 – 64 |
| C | 55 – 59 |
| C- | 50 – 54 |

A restricted pass (R) **may** be awarded to those who are close to a pass (i.e. an overall score of 48-49.9%) AND who have achieved at least a 40% overall score in both in-course assessment and tests/exams. If an R grade is awarded you gain credit for the course but **cannot continue into papers that require this course as a pre-requisite**. NB. The R grade is only available at 100 and 200 level - it cannot be awarded for third year papers.

Failing grades: D 40-49 E 0-39