

School of Biological Sciences
Te Kura Pūtaiao Koiora

Course Information / *Ngā Whakamārama* - 2022

BIOL354

Animal Ecophysiology

0.125 EFTS 15 Points

Semester 2

Description / *Whakamahuki*

This course examines the physiological adaptations that permit survival of animals in the diverse range of environments they inhabit, and the regulatory mechanisms that ensure homeostasis in the face of environmental fluctuation. Aspects of human impacts on the environment and their consequences for the animals therein are also addressed (e.g. pollutants, climate change). The approach taken is comparative, drawing on both vertebrate and invertebrate examples. A major emphasis of the course is on practical learning, with laboratories that provide hands-on experience with a number of physiological techniques, in a diverse group of animals, exposed to a wide range of environmental variables.

Course Goal

To develop an understanding of the physiological mechanisms that enable animals to withstand the various and complex challenges posed by nature and humans.

Course Coordinator / *Kairuruku Akoranga*

Essie Rodgers; SBS Room 235

Email: essie.rodgers@canterbury.ac.nz

Lecturers

Essie Rodgers: essie.rodgers@canterbury.ac.nz

Elissa Cameron: elissa.cameron@canterbury.ac.nz

Lectures (*starting week 1 of semester 2*) **and laboratories** (*starting second week of semester 2*)

See Course Information System for timetable:

[https://www.canterbury.ac.nz/courseinfo/GetCourseDetails.aspx?course=BIOL354&occurrence=22S2\(C\)&year=2022](https://www.canterbury.ac.nz/courseinfo/GetCourseDetails.aspx?course=BIOL354&occurrence=22S2(C)&year=2022)

All lectures start on the hour.

Graduate Profile / *Āhuatanga Taura*

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, K3 Traditional and contemporary realities of Māori society e.g. tikanga and kawa, te reo Māori
- GP5 Globally aware

Learning Outcomes / *Hua Akoranga*

*As a student in this course, I will develop **critical competence in the core academic discipline:***

- * Understand the challenges to animal life posed by different environments

Related graduate attributes: GP1, GP2, GP5

- * Understand the physiological mechanisms animals have utilised in order to cope with these challenges

Related graduate attributes: GP1, GP2, GP5

- * Understand the 'real-world' value of studying ecophysiology as a discipline, including bicultural and multicultural perspectives.

Related graduate attributes: GP1, GP2, GP3, GP5

- * Expand practical experience of basic experimental techniques in animal physiology

Related graduate attributes: GP1, GP2, GP5

- * Develop key skills in experimental design, physiological methodology, data analysis, data interpretation, literature assimilation, and scientific writing

Related graduate attributes: GP1, GP2, GP5

Principles are presented in lectures and developed in laboratories. These learning outcomes will be assessed via the end-of-course test and laboratory reports.

Transferable Skills / *Pūkenga Ngaio*

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

- Practical operation of physiological equipment. *Measuring physiological parameters is a critical tool in exercise, research, and hospital laboratories.*

Related graduate attributes: GP1, GP2

- Analysing data. *Condensing raw data into meaningful values and then assessing the resulting trends is a key skill in a number of vocations, both within science and in other areas.*

Related graduate attributes: GP1, GP2

- Synthesising information. *Assimilating presented knowledge, integrating this with your own research, then communicating it effectively in your own words is a valuable skill applicable across almost a range of fields.*

Related graduate attributes: GP1, GP2, GP5

- Writing reports. *Using scientific databases to find literature, integrating with your own findings, and then effectively communicating this in a written form is absolutely critical in science.*

Related graduate attributes: GP1, GP2

- Working as a team. *Many labs will require you to work in teams, a task that will involve effective organization, problem-solving, communication, co-ordination, and interpersonal attributes.*

Related graduate attributes: GP2, GP3, GP5

Timetable

Lectures

Two lectures per week, during Term 3 and Term 4. Please check course information for lectures times and locations.

Students should note that in the Science Faculty the average student is responsible for approximately 4.5 hours of additional study for each hour of lecture at the 300-level.

Laboratories

Please note that **labs start in the second week of Term 3.**

The laboratory is in **West 543 Biology Lab**. Four hour slots are allocated, but most labs should finish within three hours. All labs will be completed in Term 3.

Labs will run on modular basis with each group in the lab doing a different lab, and each week the groups will rotate to a new lab set-up. This has been initiated to deal with the large growth in student numbers in this course and the limited resources that are available. The drawback with this approach is that the labs will not always follow along with the lecture material.

Assessment / Aromatawai

Final exam 60%

Laboratory assessments 40% (Two lab reports 15% each; lab attendance 2.5% per lab).

Textbooks

The recommended text is Wilmer *et al.*, but there are a number of supplementary texts that will provide suitable background information to particular lectures and/or the course in general. These texts are all on restricted library loan. For some lectures, primary literature (*i.e.* journal articles) may form the basis of the recommended reading. This reading will always be made available, either through Learn or via restricted library loan.

Recommended text:

Willmer, Stone and Johnston, Environmental Physiology of Animals, 2nd ed., Blackwell, 2005.

Supplementary texts:

Withers, Comparative Animal Physiology, Saunders College Publishing, 1992.

Hill, Wyse and Anderson, Animal Physiology. Sinauer Associates, 2004

Sherwood, Klandorf and Yancey, Animal Physiology: from genes to organisms, Thomson Brooks/Cole, Second Edition 2013.

Schmidt-Nielsen, Animal Physiology: adaptation and environment, 5th edition, Cambridge University Press, 1997

Randall, Burggren and French, Eckert's Animal Physiology: mechanisms and adaptations, 5th edition, Freeman

Hochachka and Somero, Biochemical Adaptation, Oxford University Press, 2002

Electronic Distribution of Course Material

Information about the course, including the course handout, notices, summaries of lectures and other details will be placed on Learn.

From time to time notices about the course will be sent via email. It is assumed that all members of the class regularly check their email accounts on the UC student system.

Students with Disabilities:

Students with disabilities should speak with someone at the Equity & Disability Service, if you have not already done so (<https://www.canterbury.ac.nz/equity-disability/>). Please speak to the course coordinator at least one week before any course activity for which you have a special requirement.

Prerequisites BIOL250

Course content / *Hōtaka*

Date	Lecture	Lecture Topic	Labs/assessments
19/7	1 (EC)	Introduction adaptation to environment, size, metabolism	No laboratory in week 1
21/7	2 (EC)	Measuring metabolic rates	
26/7	3 (EC)	Scaling	Lab 1: Stress hormones
28/7	4 (EC)	Surviving anoxia or respiratory adaptations	
2/8	5 (EC)	Digestive physiology dietary specialisation	Lab 2: Crayfish heart rate
4/8	6 (EC)	Digestive physiology for flight	
9/8	7 (EC)	Reproductive physiology	Lab 3: Frog jumping
11/8	8 (EC)	Reproductive physiology, contraception	
16/8	9 (EC)	Endocrine disruptors	Lab 4: Nitrogen excretion
18/8	10	Guest lecture	
23/8	11 (ER)	Diving physiology 1	
25/8	12 (ER)	Diving physiology 2	
13/9	13 (ER)	Water & Solute Balance	
15/9	14 (ER)	Ocean acidification	
20/9	15 (ER)	Thermal physiology & climate change	
22/9	16 (ER)	Endotherms in the cold	
27/9	17 (ER)	Ectotherms in the cold	
29/9	18 (ER)	Physiologist's toolbox- recent advances	
4/10	19 (ER)	Eco-physiological applications	
6/10	20 (ER)	Round-up	

Note that this schedule and some of the lecture content may be subject to change.

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

[updated 3 April 2020]

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

What do I do if I have to miss something or if my performance was impaired?

If you feel that **illness, injury, bereavement or other extenuating circumstances beyond your control** prevented you from completing an item of assessment 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 will also need to 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 assessment – they do not excuse you from doing the assessment within a reasonable time agreed with the course coordinator. You should expect to be required to submit additional work if you miss a major assignment (e.g. a field trip for which a major write-up is required).

You should also apply for Special Consideration if you are not be able to complete an assessment or attend a field trip because of **involvement in international or national representative sport or cultural groups**. Please review the Special Considerations policy, because very few kinds of activities will be eligible for such consideration (e.g. holiday trips, birthday parties etc. are not given special status in the University policy).

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.

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.

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 may request 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 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), unless directed otherwise by the course coordinator. 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>). In addition, you may also be asked to submit your work electronically (via Learn) for analysis in *Turnitin*.

Marked assignments 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. **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 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.

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) 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

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