

## School of Biological Sciences

### *Te Kura Pūtaiao Koiora*

Version: 20 Jan 2020

## Course Information / *Ngā Whakamārama- 2020*

### **BIOL270 Ecology**

0.125 EFTS, 30 points, Semester 1

#### **Description / *Whakamahuki***

This course provides a fundamental grounding in the main concepts, applications and practical skills used in ecology, the study of relationships between organisms and their environment. The most important concepts in population, community, landscape and ecosystem ecology are covered. These are considered using examples from across marine, freshwater, forest, grassland, urban and production ecosystems, and with particular reference to the factors controlling the distribution of plants, animals and microbes in New Zealand, and their differences to other countries. There is a particular emphasis on the problems and issues affecting natural systems, and how ecological knowledge can be applied to achieve solutions. A highlight includes a four-day field trip to the UC Cass field station near Arthur's Pass National Park. Combined with laboratory sessions prior to cultivate basic skills, the field course allows students to develop expertise in field experimental design and sampling, data analysis and interpretation, as well as providing practical experience in some wonderful high country environments. Overall, this course provides both a comprehensive platform for those wanting to undertake more advanced ecological study and a thorough overview for those wanting to compliment other environmental knowledge.

To undertake all aspects of the course, students will need to have a reasonable level of fitness that allows them to travel over untracked forest and grassland, and have footwear and clothing that allows them to undertake field work safely in a mountain environment. A basic understanding of biology is assumed, including knowledge of organismal diversity, evolution and population genetics such as that provided by BIOL 113 and 112. It will be helpful if students are actively acquiring statistical knowledge, for example, by having taken STAT111 and be taking BIOL 209. The course will also require use of the UC online 'Learn' system, and additional reading.

#### **Course Co-ordinator / *Kairuruku Akoranga***

Prof Angus McIntosh, Julius von Haast 226, ext 95186, [angus.mcintosh@canterbury.ac.nz](mailto:angus.mcintosh@canterbury.ac.nz)

#### **Teachers / *Pūkenga***

Prof Matthew Turnbull, Julius von Haast 222, ext 95153, [matthew.turnbull@canterbury.ac.nz](mailto:matthew.turnbull@canterbury.ac.nz)Prof Dave Kelly, Julius von Haast 339, ext 95182, [dave.kelly@canterbury.ac.nz](mailto:dave.kelly@canterbury.ac.nz)Dr Mads Thomsen, Julius von Haast 233, [mads.thomsen@canterbury.ac.nz](mailto:mads.thomsen@canterbury.ac.nz)

Kim Doherty (laboratory and field trip co-ordinator), room Julius von Haast 318, ext 95202,

[kimberley.roberts@canterbury.ac.nz](mailto:kimberley.roberts@canterbury.ac.nz)

#### **Goals of the Course**

We aim to introduce the key principles of ecology including their relevance to the New Zealand and international contexts, impart knowledge of their potential applications in management and conservation, develop basic field practical techniques in ecology, and build skills in the analysis and communication of ecological knowledge.

## **Intended Learning Outcomes (*Hua Akoranga*) and Associated Assessment (*Aromatawai*)**

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

- Apply the main concepts in population, community and ecosystem ecology to appropriate situations (*assessment: online quizzes and final exam; GP1\**)
- Be able to discuss and interpret factors controlling the distribution and abundance of organisms at individual to global scales (*assessment: online quizzes and final exam; GP1*)
- Describe the problems affecting ecosystems globally, and be able to discuss how ecological knowledge can be applied to achieve solutions (*assessment: online quizzes and final exam; GP2 & 5*)
- Conduct field work safely (*assessment: pre-field course health & safety requirements, start of field trip gear check, and attending the field course; GP2*)
- Develop and implement field sampling protocols including plant & animal field identification, and undertake basic data analysis and interpretation (*assessment: labs & field trip reports; GP2*)
- Synthesize scientific literature to provide appropriate background, context and interpretation for a field study in ecology (*assessment: field trip long report; GP1*)
- Analyse and present the results of an ecological field study in the format of a scientific paper (*assessment: field trip long report; GP2*)

## **Transferable Skills Register / *Pūkenga Ngaio***

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

- Synthesis & interpretation of information. *Research findings will be discussed in lectures and practical sessions, and implementing this skill will be important in all course assessment. GP1*
- Formation of hypotheses & explanations. *Developing explanations for patterns and observations is important to developing an understanding of principle concepts. We will encourage this through discussions and feedback sessions, especially on the field course. GP1*
- Be aware of biculturalism in Aotearoa New Zealand as it applies to native species as taonga. *We will discuss the concept of taonga species and Māori perspectives on traditional management of harvests. GP3.*
- Conducting safe field work. *A health & safety plan is prepared for our field work which involves identifying, and eliminating, mitigating or minimizing hazards. All students must complete a three-step procedure, including a quiz, to be able to attend the field course. GP2*
- Collecting useful quantitative data to test hypotheses including: experimental design and hypothesis formation; field sampling protocols for estimating cover, species abundance and community composition; plant and animal identification (including the use of keys); and data organization and manipulation in spreadsheets. *We will conduct two smaller field sampling exercises in the labs to build skills for four more sophisticated field studies that will be undertaken on the field course. These four field investigations provide both the real-world context for lectures and develop hands-on practical skills, and will involve sampling both plant and animal communities in the Canterbury high country. GP1,2 & 4*
- Basic data analysis and interpretation (t-test, chi-square test and ordination). *Important for research, as well as in all private-sector and government organizations to ensure rigour in findings. These will be introduced in the laboratory sessions and will be applied to the field data collected on the field course and used in both short and long report write-ups. GP2*
- Writing a report in the format of a short report & a scientific paper. *Clear written communication is especially important in ecology where a main goal is to influence the management of natural resources and ecosystems. One laboratory will be devoted to developing scientific reading and writing skills, and the components required in the long reports will be listed in a marking schedule in the field course handbook. Writing for specific audiences is important. GP 2*

\*GP1, GP2, etc, refer to Graduate Profile attributes: (1) Critically competent in a core academic discipline of their degree; (2) employable, innovative and enterprising; (3) biculturally competent and confident; (4) engaged with the community; and (5) globally aware.

## Assessment / *Aromatawai*

The course is conducted by lectures, laboratories, local field excursions, online quizzes, a **compulsory** field trip in the mid semester lecture break and a final exam, as detailed below. Additional information including course handouts, supplementary reading and field trip details will be posted on Learn.

- 15% online test on lectures 1-12 (Turnbull material) to be completed in one hour, 7- 8 pm, online at course Learn site on Tuesday 10 March.
- 10% (2 x 5%) short field trip reports, due during the field trip. Full assessment details will be provided in the field course manual at the start of the field trip.
- 30% major field trip report due Tuesday, 122 May at 5 pm to BIOL270 assignment slot on level 2, Julius von Haast building, AND online at Learn. Full details will be provided in the field course manual.
- 45% final exam covering lectures 13- 46 (i.e., Kelly, McIntosh & Thomsen lectures). Details of exact format will be provided in Term 2 ,but likely short essay type questions.

Note that Biology policy (see end of this Course Information for details) requires you to average at least 40% across the interm work (2 short field trip reports, and major field trip report), AND at least 40% across the tests (online test and final exam), AND get an overall mark of at least 50%, to pass the course.

We will also run four online quizzes to help your revision. While these are not part of course assessment, we will record your marks in case they can be helpful in applications for aegrotat assessment.

## Laboratories

Laboratories take place during weeks 3-5 of the semester. See schedule below and course Information System (CIS) for more details, including room locations. Laboratory introductory talks will begin promptly on the hour. No bare feet or jandals etc, or eating in the lab. **NB the location of laboratory sessions varies among weeks – see the CIS for exact details!**

## Field Trip

We will run four-day trip to the UC Cass Field Station near Arthur's Pass National Park in the mid semester break. You pick one of the three trips: either **Trip 1, 17-20 April 2020; Trip 2, 20-23 April 2020; or Trip 3, 23-26 April 2020**. Importantly, after 26 February you will need to book your preference for one of the trips in the CIS and you will need to complete the health and safety requirements on the course Learn site by **13 March** to attend the field trip. Note that the field trip is **compulsory and provides the source of all in-term assessment**. If you miss the field trip without a valid reason, you may not be able to pass the course.

To participate in the field trip students will need to have a **level of fitness** that allows travel over untracked forest and grassland, and have **footwear and clothing** that allows field work to be undertaken safely in a mountain environment. If either of these aspects will pose a problem for you, please contact the field trip organiser, Kim Doherty, as soon as possible.

## Textbook

Smith, T. M & Smith L. S. (2015) Elements of Ecology, 9<sup>th</sup> (Global) Edition. Pearson Education Limited, Edinburgh Gate, England. (Note this is the first year we are using this text)

## Useful reading

Begon M, Howarth RW, Townsend CR (2014) Essentials of ecology, 4th edition. Blackwell. (Previous course textbook)

Dawson, J, Lucas, R (2000) Nature guide to the New Zealand forest. Godwit. (Field guide useful for field course).

**Lecture & Laboratory Timetable (*Wātaka*) 2020**

Week	Date	Lect. no.	Lecture Topic	Labs & tutorials
<b>Matthew Turnbull: Introduction to ecology, environmental factors &amp; ecosystem processes</b>				
1	Feb 17	1	Principles of ecology	
	19	2	Ecological research - rigour & experimental design	
	20	3	Physical environment I	
	21	4	Physical environment II	
2	24	5	Adaptation to the environment I	
	26	6	Adaptation to the environment II	
	27	7	Adaptation to the environment III	
	28	8	Adaptation to the environment IV	
3	Mar			Lab 1 runs this week: Sampling (Turnbull)
	2	9	Ecosystem energetics I	
	4	10	Ecosystem energetics II	
	5	11	Nutrient cycling in ecosystems I	
	6	12	Nutrient cycling in ecosystems II	
<b>Dave Kelly: Population ecology &amp; competition</b>				
4	9	13	Life histories: life tables	Lab 2 runs this week: Experimental Design (Kelly)
	10			<b>Online 1-hr TEST (Turnbull lects) 7-8pm</b>
	11	14	Life history strategies	
	12	15	Tradeoffs: cost of reproduction	
	13	16	Tradeoffs: offspring size/number	
5				Lab 3 runs this week: Writing & reading (McIntosh)
	16	17	Tradeoffs: parent-offspring conflict	
	18	18	Intra-specific competition	
	19	19	Dispersal: plants	
	20	20	Dispersal: animals	
6	23	21	Metapopulation dynamics	
	25	22	Mutualisms: pollination, dispersal	
	26	23	Pathogens	
	27	24	Interspecific competition	
<b>Angus McIntosh: Interactions &amp; food webs</b>				
7	30	25	Prey selection & foraging	
	31			Quiz 1 (Lects 13-24): online 11 am
	Apr 1	26	Predator avoidance & the ecology of fear	
	2	27	Predator and prey populations	
	3	28	Trophic cascades & top-down/bottom-up control	
<b>Mid semester break: Four-day field trips to Cass</b>				
See details above for dates and assessment				
8	27		No lecture => ANZAC holiday	
	29	29	Herbivory & plant defences	
	30	30	Predator impacts on communities	
	May 1	31	Indirect effects & food webs	
9	7	32	Food web stability	Field report tutorials this week
	8	33	Food chain length	
	9	34	Ecosystem function and biodiversity	
	10	35	Invaders & invasions	
<b>Mads Thomsen: Community ecology</b>				
10	11	36	Community structure I	
	12			<b>30% field trip project due 5 pm</b>
	13	37	Community structure II	
	14	38	Factors affecting community structure I	Quiz 2 (Lects 25-35): Online 11 am
	15	39	Factors affecting community structure II	
11	18	40	Community dynamics	
	20	41	Landscape dynamics	
	21	42	Large scale patterns	
	22	43	Climate changes I	
12	25	44	Climate changes II	
	27	45	Production systems	
	28	46	Protected areas	
	29	47	Cross-ecosystem ecology	Quiz 3 (Lects 36-47): Online 4 pm

## Feedback from Course Surveys

On a 1-5 scale where 1 = worst and 5 = best (last surveyed in 2018)

Standard questions	2018 (n=53, 84%)
Q1 - The materials provided helped me to understand what was required to succeed in this course.	4.5
Q2 - The organisation of this course helped me learn.	4.5
Q3 - I found the workload was appropriate to the level of the course.	4.3
Q4 - I found the assessments appropriate for the course.	4.4
Q5 - Where I sought feedback on my assessments, I found it helpful.	4.3

The following issues and comments (with number of students) were raised feedback by students at the 2018 end-of-course survey and some surveys prior. Actions or responses indicated in *italic*.

1. Online quizzes useful (1); quizzes should count towards assessment (1). *They used to count towards assessment, but they probably work better as a very good way of helping your revision.*
2. Use grade book (1); feedback on short reports useful for long reports & tutorials helpful for long report write-up (3) – *We do use gradebook for the test. However, we do want you to come in and collect the other graded work so you can see the feedback along with the grades. Thus we don't put the report grades up on gradebook till later. It's always a bit sad when there is a pile of marked assignments sitting there at the end of the course. The tutorials are a great opportunity to discuss aspects of the long report write up. One student said in the feedback: short reports were given back before the long report due date which helped us improve them and our writing skills in general*
3. Field trip was great: tied course together, good see how things worked in the real world, getting to know class, practical exercises useful, enjoyable, hands-on (many students). *Thanks, that's just what we hoped!*
4. It would have been nice to have a few more readings which were discussed briefly in class (1) *Readings are definitely part of each section of the course and can be assessed. We'll be making a bigger effort in to mention these in class.*
5. Test helpful for splitting up material & giving feedback (2); and first test is intense (1); smaller exam (1); spacing of assessments spot on – *Yes, the test is open book, but you're not meant to have reading/browsing time. We have tweaked the amount of work required in the test given the time allowed to improve the balance. We do think the test is a really useful aid to learning though coming early in the course. It would be difficult to shrink the exam proportion without adding a lot more work in the middle of the course (which is when you're working on the field trip reports). The overall score here suggest we have got the balance about right.*

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

[updated 12 June 2018]

**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 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 <http://www.canterbury.ac.nz/study/special-consideration/> and you need to notify the course coordinator *within five days* of the assessment or its due date. If you apply for Special Consideration, because of medical reasons, you should visit a doctor within 24 hours of the assessment (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).

In rare cases you may not be able to complete an assessment or attend a field trip, because of **involvement in international or national representative sport or cultural groups**. In such cases you should also apply for Special Consideration. Please review the Special Considerations policy because very few kinds of activities will be eligible for 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/> within five days of the end of the main examination period for the semester.

### **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 are in any doubt about appropriate use of published material, please speak with a member of academic staff. If you are still unsure what plagiarism is, then seek advice.

It is a School policy that courses may request 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 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 must be handed in by the due date to gain full credit
- work handed in up to 7 days after the deadline will be marked, but the marks will be discounted 25% before they are recorded to the student's credit
- any work handed in more than 7 days after the deadline date 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. It also makes things easier to assess. 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