



UNIVERSITY OF  
CALGARY

DEPARTMENT OF BIOLOGICAL SCIENCES  
COURSE OUTLINE

1. **Course:** **BIOLOGY 313 – Principles of Ecology**

Lecture Section(s)	L01	MWF	15:00-15:50	SB 103	WINTER 2015
<b>Instructor(s):</b>	Dr. K. Flanagan		BI 266		kmflanag@ucalgary.ca
	Dr. M. Kulbaba		BI 463		mwkulbab@ucalgary.ca

D2L course name: BIOL 313 L01 - (WINTER 2015) – PRINCIPLES OF ECOLOGY (W2015BIOL313L01)

Biological Sciences Department BI 186 403-220-3140 biosci@ucalgary.ca

2. **Prerequisites:** **Completion of at least four full course equivalents, including Biology 233 or any two of Biology 231, 241, 243**

See section 3.5.C in the Faculty of Science section of the online Calendar  
[www.ucalgary.ca/pubs/calendar/current/sc-3.5.html](http://www.ucalgary.ca/pubs/calendar/current/sc-3.5.html)

Note: Knowledge of Mendelian genetics is a distinct asset. Students are strongly advised to take Biology 311 prior to or concurrently with Biology 313.

3. **Grading:** The University policy on grading and related matters is described sections [F.1](#) and [F.2](#) of the online University Calendar. In determining the overall grade in the course the following weights will be used:

**Lab Component**

**Individual Work**

Assignment 1	3%
Assignment 3	5%
Assignment 4	5%
Assignment 5	5%
Term Project	7%

**Team Work<sup>1</sup>**

Assignment 2	1%
Quiz #1	2%
Quiz #2	2%
Quiz #3	2%
Term Project Metadata	3%

**Lecture Component**

Participation	
Top Hat	3%
Peer Evaluations	2%
Midterm Exam	30%
Final Examination <sup>2</sup>	30%

**March 6 @ 18:30-20:30 in ICT 102 & 121**

**Students must achieve a passing grade on both the lecture portion of the course and the laboratory portion of the course to qualify for a passing grade overall.**

Each piece of work in the categories outlined above submitted by the student will be assigned a percentage score. A student's grade is determined by marks for both individual work and team work components (i.e., team quizzes and assignments). The student's average percentage score for the various components listed above will be combined with the indicated weights to produce an overall percentage for the course, which will be used to determine the course letter grade using the conversion scale provided below.

<sup>1</sup>At the end of the term, each student will be asked to *evaluate the contributions of the other members of his/her group*. The student is asked to distribute 100 points among the other members of the group and to add some comments for each person, providing the rationale for the point distribution. All team members get a "peer score", which is the sum of the points that they are granted from each teammate. The instructor will also assess each student based on the quality of feedback that they provide to other students. These two values determine an individual's peer evaluation score. Each student's total team work mark will be *multiplied by that student's peer evaluation score* to determine their final mark for the team work component of the course.

<sup>2</sup> There will be a final exam scheduled by the Registrar's office

#### Grading Scheme

A+	95
A	86
A-	80
B+	77
B	73
B-	70
C+	67
C	63
C-	60
D+	55
D	50
F	<50%

4. **Missed Components of Term Work:** The regulations of the Faculty of Science pertaining to this matter are found in the Faculty of Science area of the Calendar in [Section 3.6](#). It is the student's responsibility to familiarize himself/herself with these regulations. See also [Section E.6](#) of the University Calendar

Students who are absent from the midterm exam because of illness or other unforeseen circumstances may be granted an excused absence by the Course Coordinator upon presentation of adequate documentation (a completed Physician/Counselor form <http://www.ucalgary.ca/registrar/PDFs/phycoun.pdf> for illness; equivalent documentation for other circumstances). There will be no "make-up" examinations for excused absences. The weight assigned to the midterm examination will be transferred to the final examination.

Similarly, students who are unable to submit laboratory assignments or complete a lab quiz on time because of similar circumstances will be required to submit the same type of documentation to the Lab Coordinator in order to be considered for a time extension. You must provide the completed form, signed by your physician, to the Lab Coordinator within **48 hours** from the date that you missed the lab, class or midterm.

5. **Scheduled out-of-class activities: March 6 @ 18:30-20:30 in ICT 102 & 121**

**REGULARLY SCHEDULED CLASSES HAVE PRECEDENCE OVER ANY OUT-OF-CLASS-TIME-ACTIVITY.** If you have a clash with this out-of-class-time-activity, please inform your instructor as soon as possible so that alternative arrangements may be made for you.

6. **Course Materials:** **Required:** Ecology: Concepts & Applications, Molles and Cahill, McGraw-Hill Ryerson. 3<sup>rd</sup> Canadian Ed.

**Required:** Biology 313 Laboratory Manual – 2014/2015 – available at University Bookstore

**Online Course Components:** Students will use **Top Hat** (TH; <https://tophat.com/>) in class to enhance learning in the classroom. If a student completes 75% or more of the in-class participation activities, s/he will receive the full 3% of the participation mark. **If s/he completes less than 75% of the in-class participation activities, s/he will receive 0% for the Participation mark.** It is the student's responsibility to ensure that their participation is being recorded by the TH system, and any discrepancies must be brought to the attention of Dr. Flanagan by 1700 on April 6, 2015 at the latest (but we encourage doing so at the earliest opportunity), as we will be unable to modify participation grades after this time. If a student is unable/unwilling to use the TH system, they must contact Dr. Flanagan within the first two weeks of class to make alternate arrangements

7. **Examination Policy:** Non-programmable calculators will be allowed for the midterm but NOT the final exam. Students should also read the Calendar, [Section G](#), on Examinations.
8. **Writing across the curriculum statement:** In this course, the quality of the student's writing in laboratory reports will be a factor in the evaluation of those reports. See also [Section E.2](#) of the University Calendar.
9. **Human studies statement:** Studies in the Biological Sciences involve the use of living and dead organisms. Students taking laboratory- and field-based courses in these disciplines can expect involvement with and experimentation on such materials. Students perform dissections on dead or preserved organisms in some courses. In particular courses, students experiment on living organisms, their tissues, cells, or molecules. Sometimes field work requires students to collect a variety of living materials by many methods, including humane trapping. All work on humans and other animals conforms to the Helsinki Declaration and to the regulations of the Canadian Council on Animal Care. The Department strives for the highest ethical standards consistent with stewardship of the environment for organisms whose use is not governed by statutory authority. Individuals contemplating taking courses or majoring in one of the fields of study offered by the Department of Biological Sciences should ensure that they have fully considered these issues before enrolling. Students are advised to discuss any concern they might have with the Undergraduate Program Director of the Department.

**10. OTHER IMPORTANT INFORMATION FOR STUDENTS:**

- (a) **Academic Misconduct:** (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under [Section K. Student Misconduct](#) to inform yourself of definitions, processes and penalties
- (b) **Assembly Points:** In case of emergency during class time, be sure to FAMILIARIZE YOURSELF with the information on [assembly points](#).
- (c) **Academic Accommodation Policy:** Students with documentable disabilities are referred to the following links: [Calendar entry on students with disabilities](#) and [Student Accessibility Services](#).
- (d) **Safewalk:** Campus Security will escort individuals day or night (<http://www.ucalgary.ca/security/safewalk/>). Call 220-5333 for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.
- (e) **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). As one consequence, students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information see also
- (f) <http://www.ucalgary.ca/secretariat/privacy>.
- (g) **Student Union Information:** [VP Academic](#) Phone: 220-3911 Email: [suvpaca@ucalgary.ca](mailto:suvpaca@ucalgary.ca).  
SU Faculty Rep. Phone: 220-3913 Email: [sciencerep@su.ucalgary.ca](mailto:sciencerep@su.ucalgary.ca); [Student Ombudsman](#)
- (h) **Internet and Electronic Device Information:** You can assume that in all classes that you attend, your cell phone should be turned off unless instructed otherwise. Also, communication with other individuals, via laptop computers, Blackberries or other devices connectable to the Internet is not allowed in class time unless specifically permitted by the instructor. If you violate this policy you may be asked to leave the classroom. Repeated abuse may result in a charge of misconduct.
- (i) At the University of Calgary, feedback provided by students through the Universal Student Ratings of Instruction (USRI) survey provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses ([www.ucalgary.ca/usri](http://www.ucalgary.ca/usri)). Your responses make a difference - please participate in USRI Surveys.

Department Approval \_\_\_\_\_ ORIGINAL SIGNED \_\_\_\_\_ Date \_\_\_\_\_

Associate Dean's Approval for  
out of regular class-time activity: \_\_\_\_\_ ORIGINAL SIGNED \_\_\_\_\_ Date: \_\_\_\_\_  
B313 W15; 12/15/2014 9:14 AM

UNIVERSITY OF CALGARY  
DEPARTMENT OF BIOLOGICAL SCIENCES  
COURSE OUTLINE

BIOLOGY 313  
PRINCIPLES OF ECOLOGY

PREREQUISITE(S): **Completion of at least four full course equivalents, including Biology 233 or any two of Biology 231, 241, 243.**

Note: Students may not register in a course unless they have a grade of at least C- in each prerequisite course.

**COURSE PERSONNEL:**

LECTURER(S):	Dr. K. Flanagan	BI 266	kmflanag@ucalgary.ca
	Dr. M. Kulbaba	BI 463	mwkulbab@ucalgary.ca

COURSE & LAB COORDINATOR:	Dr. K. Flanagan	BI 266	kmflanag@ucalgary.ca
------------------------------	-----------------	--------	----------------------

LAB TECHNICIAN:	Louise Hahn	BI 235	lhahn@ucalgary.ca
-----------------	-------------	--------	-------------------

TEACHING ASSISTANTS: Contact information for TAs will be updated on D2L in the first week of lectures

**OVERVIEW OF THE COURSE:**

This is an interesting, relevant, and challenging course. In this course, you will explore questions, such as:

- 1) How do environmental factors dictate the distribution of organisms across the globe?
- 2) How do individuals make 'decisions' regarding mate choice and the acquisition of resources?
- 3) What controls the size of a population?
- 4) How do anthropogenic factors, such as, habitat fragmentation impact populations?
- 5) How do we make decisions regarding the management of populations? How do we control invasive species? How do we conserve declining species?

In the labs, you will develop some fundamental skills that apply to any discipline in biology, including how to design an experiment, write a scientific paper and perform some basic statistical analyses, all while exploring some of the current issues in Ecology. We are excited this semester to be introducing Team Based Learning to the labs. You will be working in Teams to conduct your own Term research project on a research topic you've developed (with lots of support from TAs and us).

The course is broken into 5 big 'themes' each with a series of topics:

**Theme 1:** Introduction/Context /Evolution:

- *Topic 1: Ecology in the context of Evolution*

**Theme 2:** Ecology of Individuals:

- *Topic 1: How do organisms deal with environmental variability? How does this influence the geographic distribution of a species?*
- *Topic 2: How do organisms deal with limited resources/nutrients/energy?*
- *Topic 3: How do organisms choose mates?*
- *Topic 4: Life histories and Trade-offs*

**Theme 3:** Ecology of Populations:

- *Topic 1: How do vital rates of populations influence the rate of change of a population?*
- *Topic 2: How do intraspecific interactions influence the rate of change of a population?*
- *Topic 3: Population structure, age, stage, sex*
- *Topic 3: Spatial Population dynamics (meta-populations) & applications*

**Theme 4:** Ecology of Species Interactions:

- *Topic 1: Competition*
- *Topic 2: Predation & Herbivory*
- *Topic 3: Parasitism*
- *Topic 4: Mutualism*

**Theme 5:** Ecology of Communities and Ecosystems:

- *Topic 1: Species Diversity*
- *Topic 2: Community Assembly and Ecosystem Function*
- *Topic 3: Landscape Ecology and Macroecology*

## RESPONSIBILITIES and EXPECTATIONS

Our philosophy of teaching is that it is our responsibility to 'set the stage' for learning to occur. It is our job to ensure that the classroom environment, support materials, assessment tools used all support the conditions that allow students to learn. Feedback from students is very important in this so that we will know whether such conditions exist, how well the course is going and where problems are arising. In addition to a mid-semester and an end-of-semester course evaluation, we will also have **Peer Mentors** who will provide feedback to us about how the course is going based on what they are hearing from you or observing in class. Please feel free to contact us or the Peer Mentors about the course at any time. It is also our goal that, as much as possible, students will spend class time actively working with course material and applying what has been learned from the readings and lectures. This means coming to class prepared and willing to participate.

### My expectations of you:

- treat others in class with respect. This means:
  - no talking when I am teaching
  - turn off cell phones in class (unless we are doing Top Hat)
  - restrict your use of laptops and other electronic devices to only those activities directly related to class. If you violate this policy or disturb other students you may be asked to leave the classroom
  - be on time & come prepared; participate actively in class and lab activities

### What you can expect from us:

- treat all students with respect
- start and end classes on time
- available outside of class time to discuss course content or any other course concerns
- prepare reading guides and organize review sessions for exams
- post materials for lecture and labs on D2L in a timely manner
- reply to emails within 24 h (except weekends)

Tentative BIOL 313 Schedule Winter 2015<sup>1</sup>

Day	Date	Lecture	Reading p.#	Labs	Assessment	
M	<u>Jan</u>	12	1: Introduction to Ecology	Ch 1 & handout	<b>Lab 1: (Week 1)</b>  <b>Introduction to Ecology</b>	<b>NO ASSIGNMENT</b>
W		14	2: Evolution: why we need to understand evolution to understand ecology Part I	89-95		
F		16	3: Ecological Interactions & Evolution Part II	96-110		
M		19	4: Physiological Ecology: Limiting factors, performance curves and distributions of organisms	115-144	<b>Lab 2: (Week 2)</b>  <b>Scientific Writing &amp; Term project</b>	1: Introduction to Term Project (3%) <b>(Due: Week 4)</b>
W		21	5: Physiological Ecology: Limiting factors, temperature, distribution limits and climate change	115-144		
F		23	6: Behavioural Ecology: How do individuals deal with limited resources/energy?	191-196		
M		26	7: Behavioural Ecology: How do individuals find prey?	190-191	<b>Lab 3: (Week 3)</b>  <b>Ecological Sampling &amp; Experimental Design</b>	2: Experimental Design for Term Project (1%) <b>(Due: Week 4)</b>
W		28	8: Behavioural Ecology: How do individuals choose mates?	216-226		
F		30	9: Behavioural Ecology: How & why do the life history strategies of organisms vary?	231-241		
M	<u>Feb</u>	2	10: Behavioural Ecology: How & why do the life history strategies of organisms vary?	244-250	<b>Lab 4: (Week 4)</b>  <b>Fruit Fly Foraging</b>	3: Methods, Results and Figures for Fly lab (5%) <b>(Due: Week 7)</b>
W		4	11: Case Study: Using GAME THEORY to understand behaviour*	226-228		
F		6	12: Population Ecology: How do the vital rates of individuals influence populations?	311-312, 319-322		
M		9	13: Population Ecology: How do intraspecific interactions affect populations?	323-328	<b>Lab 5: (Week 5)</b>  <b>Data Management and Analysis</b>	<b>Team Quiz #1 (2%)</b>
W		11	14: Population Ecology: How do differences among individuals affect populations?	293-305, 316-319		
F		13	15: Population Ecology: What are the consequences of examining populations spatially?	272-280, 558-567		
M		16	<b>Reading Week (no lecture)</b>	n/a	<b>NO LAB (Week 6)</b>	<b>NO ASSIGNMENT</b>
W		18	<b>Reading Week (no lecture)</b>	n/a		
F		20	<b>Reading Week (no lecture)</b>	n/a		
M		23	16: Case Study: Caribou Conservation Controversy*	handout	<b>Lab 6: (Week 7)</b>  <b>Population Growth</b>	4: Results and Discussion Population Growth lab (5%) <b>(Due: Week 9)</b>
W		25	17: Case Study: Zombie Attack!*	handout		
F		27	18: Review Lecture & Top Hat practice*	n/a		
M	<u>Mar</u>	2	19: Introduction to the second half	334-337	<b>Lab 7: (Week 8)</b>  <b>SIMBIO: Isle Royale &amp; Term Projects</b>	<b>Team Quiz #2 (2%)</b>
W		4	20: Competition (1)	Ch 13 (ignore self-thinning)		
F		6	21: Competition (2)	"		
M		9	22: Competition (3)	"	<b>Lab 8: (Week 9)</b>  <b>Multispecies Interactions</b>	5: Poster for Multispecies Interactions (5%) <b>(Due: Week 11)</b>
W		11	23: Predation (1)	"		
F		13	24: Predation (2)	370-385		
M		16	25: Herbivory	"	<b>Lab 9: (Week 10)</b>  <b>SIMBIO: Keystone Predators &amp; Term Projects</b>	<b>Team Quiz #3 (2%)</b>
W		18	26: Parasitism & Disease (1)	366-370		
F		20	27: Parasitism & Disease (2)	n/a		
M		23	28: Mutualism	392-395	<b>Lab 10: (Week 11)</b>  <b>Term Project</b>	<b>NO ASSIGNMENT</b>
W		25	29: Species Abundance & Diversity (1)	"		
F		27	30: Species Abundance & Diversity (2)	392-393, 396-399, 404-414		
M	<u>Apr</u>	30	31: Community Structure (1)	420-430	<b>Lab 11: (Week 12)</b>  <b>Term Project Wrap up</b>	<b>NO ASSIGNMENT</b>
W		1	32: Community Structure (2)	446-476		
F		3	<b>Good Friday (University closed)</b>	"		
M		6	33: Nutrients and energy flow	508-518, 525-529	<b>Lab 12: (Week 13)</b>  <b>Term Project Wrap up</b>	<b>NO ASSIGNMENT</b>
W		8	34: Landscape Ecology	550-566		
F		10	35: Macroecology (1)	578, 582-595		
M		13	36: Macroecology (2)	"	<b>NO LAB (Week 14)</b>	<b>Term Project (7%) &amp; Meta-data (3%) (Due: Apr 15)</b>
W		15	37: Review*	n/a		

<sup>1</sup> The schedule may deviate from this slightly due to the needs of the class. The first 18 lectures will be taught by Dr. Flanagan and lectures 19-37 will be taught by Dr. Kulbaba. All reading chapter and page numbers refer to the required textbook by Molles and Cahill; Lectures indicated with an \* have expectations for high student participation.