



UNIVERSITY OF  
CALGARY

DEPARTMENT OF BIOLOGICAL SCIENCES  
COURSE OUTLINE

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

Lecture Section(s) L01 MWF 13:00-13:50 ST 140 WINTER 2017

<b>Lab Section(s)</b>	<b>B01, 02, 03</b>	<b>Tuesday at 9:00 AM</b>	<b>BI 232, 234, 234A</b>
	<b>B04, 05, 06</b>	<b>Tuesday at 12:00 Noon</b>	<b>BI 232, 234, 234A</b>
	<b>B07, 08, 09</b>	<b>Tuesday at 3:00 PM</b>	<b>BI 232, 234, 234A</b>
	<b>B10, 11, 12</b>	<b>Thursday at 9:00 AM</b>	<b>BI 232, 234, 234A</b>
	<b>B13, 14, 15</b>	<b>Thursday at 12:00 Noon</b>	<b>BI 232, 234, 234A</b>
	<b>B16, 17</b>	<b>Thursday at 3:00 PM</b>	<b>BI 232, 234</b>

**Course Coordinator/Instructor(s):** Dr. K. Flanagan BI 266 kmflanag@ucalgary.ca

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

D2L course name: BIOL 313 L01 - (WINTER 2017) – PRINCIPLES OF ECOLOGY (W2017BIOL313L01)

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

2. **Prerequisites:** **Completion of at least 24 units (4.0 full-course equivalents), including Biology 233 or any two of Biology 231, 241 and 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)

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	12%

**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 25%

**Feb 27 @ 18:30-20:30 in  
EDC 179, ENA 101, ICT 121, ICT 122, ST 135**

Final Examination<sup>2</sup> 30%

**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 evaluate the contributions of the other members of his/her team (using the CATME Peer Evaluation Tool or IPT Metrics). All team members will get a “peer score” based on the final peer evaluation. The peer score for a student is the average rating of the student, divided by overall the average rating for all members of the team. This provides a way to evaluate the relative contributions of each team member to the team’s work. Each student’s total teamwork mark will be multiplied by his/her peer score to determine his/her final mark for the teamwork component of the course (10% of final grade).

<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/physcoun.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:** Feb 27 @ 18:30-20:30 in EDC 179, ENA 101, ICT 121, ICT 122/ST 135

**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 – 2017 – 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 4, 2016 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. Some teamwork resources are provided by **CATME** ([www.CATME.org](http://www.CATME.org)), a system of secure web-based tools for forming teams and conducting Peer Evaluations and assigning student to teams. This tool is free to all students. Students will be invited by email to create a CATME account in the first week of the course. The course may also use ITP Metrics, a University of Calgary - based web tool for peer assessments.

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) **Student Accommodations:** Students needing an Accommodation because of a Disability or medical condition should contact Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities available at [http://www.ucalgary.ca/policies/files/policies/procedure-for-accommodations-for-students-with-disabilities\\_0.pdf](http://www.ucalgary.ca/policies/files/policies/procedure-for-accommodations-for-students-with-disabilities_0.pdf).

Students needing an Accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, preferably in writing, to the Associate Head of Biological Sciences, Dr. H. Addy by email [addy@ucalgary.ca](mailto:addy@ucalgary.ca) or phone 403 220-3140.

(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 (FOIPPA). 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 <http://www.ucalgary.ca/secretariat/privacy>.

(f) **Student Union Information:** VP Academic Phone: 403 220-3911 Email: [suvpaca@ucalgary.ca](mailto:suvpaca@ucalgary.ca)  
SU Faculty Rep. Phone: 403 220-3913 Email: [science1@su.ucalgary.ca](mailto:science1@su.ucalgary.ca), [science2@su.ucalgary.ca](mailto:science2@su.ucalgary.ca) and [science3@su.ucalgary.ca](mailto:science3@su.ucalgary.ca);  
Student Ombuds Office: 403 220-6420 Email: [ombuds@ucalgary.ca](mailto:ombuds@ucalgary.ca); <http://ucalgary.ca/provost/students/ombuds>

(g) **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.

(h) 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.

**EMAIL COMMUNICATION:** I will be working hard to answer your emails within 24 hours (except on weekends)

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

Associate Dean's Approval for  
out of regular class-time activity: \_\_\_\_\_ ORIGINAL SIGNED \_\_\_\_\_ Date: \_\_\_\_\_  
B313 W17; 12/2/2016 2:26 PM

## OVERVIEW OF THE 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 (week 1):** Introduction/Context /Evolution:

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

**Theme 2 (weeks 2-4):** 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 (weeks 4-5):** 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 (weeks 6-8):** Ecology of Species Interactions:

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

**Theme 5 (weeks 8-11):** 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 my responsibility to 'set the stage' for learning to occur. It is my 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 me about how the course is going based on what they are hearing from you or observing in class. Please feel free to contact me or the Peer Mentors about the course at any time. It is also my 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 me:

- 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 Course Schedule<sup>1</sup>

Day	Date	Lecture	Reading p.#	Labs	Assessment
M	<b>Jan-17</b>	9 1: Introduction to Ecology	Ch 1 & handout	<b>Lab 1:</b> <b>Introduction to Ecology</b>	<b>NO ASSIGNMENT</b>
W		11 2: Evolution: why we need to understand evolution to understand ecology Part I	89-95		
F		13 3: Ecological Interactions & Evolution Part II	96-110		
M		16 4: Physiological Ecology: Limiting factors, performance curves and distributions of organisms	115-144	<b>Lab 2:</b> <b>Scientific Writing &amp; Term project</b>	1: Introduction to Term Project (3%) <b>(Due: Lab 4)</b>
W		18 5: Physiological Ecology: Limiting factors, temperature, distribution limits and climate change	115-144		
F		20 6: Behavioural Ecology: How do individuals deal with limited resources/energy?	191-196		
M		23 7: Behavioural Ecology: How do individuals find prey?	190-191	<b>Lab 3:</b> <b>Ecological Sampling &amp; Experimental Design</b>	2: Experimental Design for Term Project (1%) <b>(Due: Lab 4)</b>
W		25 8: Behavioural Ecology: How do individuals choose mates?	216-226		
F		27 9: Behavioural Ecology: How & why do the life history strategies of organisms vary?	231-241		
M	<b>Feb</b>	30 10: Behavioural Ecology: How & why do the life history strategies of organisms vary?	244-250	<b>Lab 4:</b> <b>Fruit Fly Foraging</b>	3: Methods, Results and Figures for Fly lab (5%) <b>(Due: Lab 6)</b>
W		1 11: Case Study: Using GAME THEORY to understand behaviour*	226-228		
F		3 12: Population Ecology: How do the vital rates of individuals influence populations?	311-312, 319-322		
M		6 13: Population Ecology: How do intraspecific interactions affect populations?	323-328	<b>Lab 5:</b> <b>Data Management and Analysis</b>	<b>Team Quiz #1 (2%)</b>
W		8 14: Population Ecology: How do differences among individuals affect populations?	293-305, 316-319		
F		10 15: Population Ecology: What are the consequences of examining populations spatially?	272-280, 558-567		
M		13 16: Case Study: Zombie Attack!*	handout	<b>Lab 6:</b> <b>Population Growth</b>	4: Results and Discussion Population Growth lab (5%) <b>(Due: Lab 8)</b>
W		15 17: Review Lecture & Top Hat practice*	n/a		
F		17 18: Introduction to the second half and Q & A	n/a		
M		20 <b>Reading week: no lecture</b>	n/a	<b>NO LAB</b>	<b>NO ASSIGNMENT</b>
W		22 <b>Reading week: no lecture</b>	n/a		
F		24 <b>Reading week: no lecture</b>	n/a		
M	<b>Mar</b>	27 19: Competition (1)	335-343	<b>Lab 7:</b> <b>SIMBIO: Isle Royale &amp; Term Projects</b>	<b>Team Quiz #2 (2%)</b>
W		1 20: Competition (2)	343-348		
F		3 21: Competition (3)	349-360		
M		6 22: Predation (1)	370-375	<b>Lab 8:</b> <b>Multispecies Interactions</b>	5: Poster for Multispecies Interactions (5%) <b>(Due: Lab 10)</b>
W		8 23: Predation (2)	375-378		
F		10 24: Case Study: Caribou Conservation Controversy*	handout		
M		13 25: Herbivory	362-370	<b>Lab 9:</b> <b>SIMBIO: Keystone Predators &amp; Term Projects</b>	<b>Team Quiz #3 (2%)</b>
W		15 26: Parasitism & Disease (1)	392-399		
F		17 27: Parasitism & Disease (2)	392-399		
M		20 28: Mutualism	404-417	<b>Lab 10:</b> <b>Term Project</b>	<b>NO ASSIGNMENT</b>
W		22 29: Species Abundance & Diversity (1)	420-436		
F		24 30: Species Abundance & Diversity (2)	n/a		
M		27 31: Communities	420-436	<b>Lab 11:</b> <b>Term Project Wrap up</b>	<b>NO ASSIGNMENT</b>
W		29 32: Communities (2)	Ch 17		
F		31 33: Nutrients and energy flow	Ch 17		
M	<b>Apr</b>	3 34: Landscape Ecology	Ch 20	<b>Lab 12:</b> <b>Term Project Wrap up</b>	<b>NO ASSIGNMENT</b>
W		5 35: Macroecology	Ch 21		
F		7 36: Case Study: Global Carbon Cycle and Ocean Productivity	578, 582-595		
M		10 37: Review*	Handout & 508-512	<b>NO LAB</b>	<b>Term Project (12%) &amp; Meta-data (3%) (Due: Apr 12)</b>
W		12 38: Review*	n/a		

<sup>1</sup> The schedule may deviate slightly from this due to the needs of the class. All readings are from the required textbook by Molles and Cahill.