



UNIVERSITY OF CALGARY  
FACULTY OF SCIENCE  
DEPARTMENT OF BIOLOGICAL SCIENCES  
COURSE OUTLINE

**1. Course: ECOL 429, Ecology of Individuals – Fall 2019**

Lecture 01: MWF 13:00-13:50 in MS 527

Instructor	Email	Phone	Office	Hours
Dr. Robert Barclay	<a href="mailto:barclay@ucalgary.ca">barclay@ucalgary.ca</a>	220-3564	BI 330	TBA
Dr. Kathreen Ruckstuhl	<a href="mailto:kruckstu@ucalgary.ca">kruckstu@ucalgary.ca</a>	220-8776	BI 258	TBA

**Course Coordinator:** Dr. Barclay

**Course Site:** D2L: ECOL 429 L01-(Fall 2019)-Ecology of Individuals

Note: Students must use their U of C account for all course correspondence.

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

**2. Requisites:**

See section [3.5.c](#) in the Faculty of Science section of the online Calendar.

**Prerequisite(s):**

Biology 313 and 315

**NOTES:** There is a week-end field trip scheduled after the start of classes.

**3. Grading:**

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

Component(s)	Weighting %	Date
Midterm Exam	30%	Thurs., Oct. 24
Lab Reports	35%	
Final Exam	35%	

This course has a registrar scheduled final exam.

Passing grades in both the laboratory and lecture components are required for a student to pass the course as a whole.

Each piece of work (reports, assignments, quizzes, midterm exam(s) or final examination) submitted by the student will be assigned a grade. The student's grade for each component 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.

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

Associate Dean's Approval for  
Out of regular class-time activity: ORIGINAL SIGNED Date: \_\_\_\_\_  
ECOL 429 co; 2019-08-23 10:25 AM

The conversion between a percentage grade and letter grade is as follows.

Tentative grade breakdown (thresholds may be lowered slightly, but will not be raised):

Letter Grade	A+	A	A-	B+	B	B-	C+	C	C-	D+	D
Min. Percent Required	90%	86%	82%	79%	76%	73%	70%	66%	62%	57%	50%

Percentages will be rounded to the nearest 0.1 (e.g., 72.45 → 72.5%, 72.44 → 72.4%)

**4. Missed Components Of Term Work:**

In the event that a student misses the midterm or any course work due to illness, supporting documentation, such as a medical note or a statutory declaration will be required (see [Section M.1](#); for more information regarding the use of statutory declaration/medical notes, see [FAQ](#)). Absences must be reported within 48 hours.

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 themselves with these regulations. See also Section E.3 of the University Calendar.

**5. Scheduled Out-of-Class Activities:**

Midterm Exam: Thursday, October 24 6:30-8:30PM TBA 30%

**WEEKEND FIELD TRIP: Saturday, September 14, 2019.**

**6. Course Materials:**

No textbook. Laboratory manual available via Desire 2 Learn

**7. Examination Policy:**

Wireless access devices, including cell phones, cannot be used during the examination. Calculators can be used with permission of the Instructor.

Students should also read the Calendar, Section G, on Examinations.

**8. Approved Mandatory And Optional Course Supplemental Fees:**

There are no mandatory or optional course supplemental fees for this course.

**9. Writing Across the Curriculum Statement:**

For all components of the course, in any written work, the quality of the student's writing (language, spelling, grammar, presentation etc.) can be a factor in the evaluation of the work. See also Section E.2 of the University Calendar.

**10. Human & Living Organism Studies Statements:**

Students will not participate as subjects or researchers in human studies.

See also [Section E.5](#) of the University Calendar.

**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 the 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 concerns they might have with the Undergraduate Program Director of the Department.

Students are expected to be familiar with Section SC.4.1 of the University Calendar.

#### 11. **Reappraisal Of Grades:**

A student wishing a reappraisal, should first attempt to review the graded work with the Course Coordinator/ Instructor or department offering the course. Students with sufficient academic grounds may request a reappraisal. Non-academic grounds are not relevant for grade reappraisals. Students should be aware that the grade being reappraised may be raised, lowered or remain the same. See Section I.3 of the University Calendar.

- a. **Term Work:** The student should present their rationale as effectively and as fully as possible to the Course coordinator/instructor within 15 days of either being notified about the mark, or of the item's return to the class. If the student is not satisfied with the outcome, the student shall immediately submit the Reappraisal of Graded Term work form to the department in which the course is offered. The department will arrange for a re-assessment of the work if, and only if, the student has sufficient academic grounds. See sections I.1 and I.2 of the University Calendar.
- b. **Final Exams:** The student shall submit the request to Enrolment Services. See Section I.3 of the University Calendar.

#### 12. **Other Important Information For Students:**

- a. **Mental Health:** The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness and academic success, and aspires to create a caring and supportive campus community where individuals can freely talk about mental health resources available throughout the university community, such as counselling, self-help resources, peer support or skills-building available through the SU Wellness Centre (Room 30, MacEwan Student Centre, Mental Health Services Website) and the Campus Mental Health Strategy website (Mental Health).
- b. **SU Wellness Center:** The Students Union Wellness Centre provides health and wellness support for students including information and counselling on physical health, mental health and nutrition. For more information, see [www.ucalgary.ca/wellnesscentre](http://www.ucalgary.ca/wellnesscentre) or call 403-210-9355.
- c. **Sexual Violence:** The University of Calgary is committed to fostering a safe, productive learning environment. The Sexual Violence Policy (<https://www.ucalgary.ca/policies/files/policies/sexual-violence-policy.pdf>) is a fundamental element in creating and sustaining a safer campus environment for all community members. We understand that sexual violence can undermine students' academic success and we encourage students who have experienced some form of sexual misconduct to talk to someone about their experience, so they can get the support they need. The Sexual Violence Support Advocate, Carla Bertsch, can provide confidential support and information regarding sexual violence to all members of the university community. Carla can be reached by email ([svsa@ucalgary.ca](mailto:svsa@ucalgary.ca)) or phone at 403-220-2208 .
- d. **Misconduct:** 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. Examples of academic misconduct may include: submitting or presenting work as if it were the student's own work when it is not; submitting or presenting work in one course which has also been submitted in another course without the instructor's permission; collaborating in whole or in part without prior agreement of the instructor; borrowing experimental values from others without the instructor's approval; falsification/ fabrication of experimental values in a report. These are only examples.
- e. **Assembly Points:** In case of emergency during class time, be sure to FAMILIARIZE YOURSELF with the information on assembly points.
- f. **Academic Accommodation Policy:** 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 [procedure-for-accommodations-for-students-with-disabilities.pdf](#).

Students needing an accommodation in relation to their coursework or to fulfill requirements for a graduate degree, based on a protected ground other than disability, should communicate this need, preferably in writing, to the Associate Head, Undergraduate of the Department of Biological Sciences, Heather Addy by email [addy@ucalgary.ca](mailto:addy@ucalgary.ca) or phone 403 220-6979. Religious accommodation requests relating to class, test or exam scheduling or absences must be submitted no later than 14 days prior to the date in question. See Section E.4 of the University Calendar.

- g. Safewalk: Campus Security will escort individuals day or night (See the Campus Safewalk website). Call 403-220-5333 for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.
- h. Freedom of Information and Privacy: This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPPA). 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 Legal Services website.
- i. 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: [sciencerep@ucalgary.ca](mailto:sciencerep@ucalgary.ca). Student Ombudsman, Email: [ombuds@ucalgary.ca](mailto:ombuds@ucalgary.ca)
- j. Internet and Electronic Device Information: Unless instructed otherwise, cell phones should be turned off during class. All communication with other individuals via laptop, tablet, smart phone or other device is prohibited during class unless specifically permitted by the instructor. Students that violate this policy may be asked to leave the classroom. Repeated violations may result in a charge of misconduct.
- k. Surveys: At the University of Calgary, feedback through the Universal Student Ratings of Instruction (USRI) survey and the Faculty of Science Teaching Feedback form provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses. Your responses make a difference - please participate in these surveys.
- l. Copyright of Course Materials: All course materials (including those posted on the course D2L site, a course website, or used in any teaching activity such as (but not limited to) examinations, quizzes, assignments, laboratory manuals, lecture slides or lecture materials and other course notes) are protected by law. These materials are for the sole use of students registered in this course and must not be redistributed. Sharing these materials with anyone else would be a breach of the terms and conditions governing student access to D2L, as well as a violation of the copyright in these materials, and may be pursued as a case of student academic or non-academic misconduct, in addition to any other remedies available at law.

## **ECOLOGY 429 – FALL 2019 TENTATIVE LECTURE SCHEDULE**

<b>Date</b>	<b>Topic</b>
September 6	Introduction to the course – <b>Barclay</b>
<b>Section I</b>	<b>Physiological/Morphological Ecology – Ruckstuhl</b>
	9 Introduction to physiological & morphological ecology
	11 Size & shape
	13 Self thinning
	16 Photosynthesis
	18 Thermal sensitivity
	20 Body temperature
	23 Thermoregulation
	25 Metabolic rate
	27 Metabolism & body size
	30 Metabolic scaling I
October 2	Metabolic scaling II
<b>Section II</b>	<b>Behavioural Ecology – Ruckstuhl/Barclay</b>

October	4	Introduction to Behavioural Ecology - <b>Ruckstuhl</b>
	7	Foraging I
	9	Foraging II
	11	Foraging III
	14	<b>THANKSGIVING – NO LECTURE</b>
	16	Fleeing I
	18	Fleeing II
	21	Fighting
	23	Social behaviour - <b>Barclay</b>
	25	Cooperation and altruism
	28	Cooperation and altruism
	30	Reproductive behaviours
November	1	Reproductive behaviours
<b>Section III</b>		<b>Life History Ecology – Barclay</b>
November	4	Life history ecology - What is a life history and how does it vary?
	6	Demography and life tables
	8	Net reproductive rate and reproductive value
	11	<b>READING DAYS – NO LECTURES</b>
	13	<b>READING DAYS – NO LECTURES</b>
	15	<b>READING DAYS – NO LECTURES</b>
	18	Is there a cost of reproduction?
	20	Why does reproductive effort vary?
	22	Trade-offs: age and size at maturity
	25	Trade-offs: size and number of offspring
	27	Aging and senescence
December	29	Aging and senescence
	2	Sex ratio of offspring and its adjustment
	4	Sex ratio of offspring and its adjustment
	6	Review

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## ECOLOGY 429 – TENTATIVE LAB SCHEDULE – FALL 2019

Week	Dates	Density effects on growth, phenology and reproduction	Herbivory effects on growth and reproduction	Ecological allometry	Bateman's principle	Animal behaviour
1	Sept 10, 12	<b>Introduction + establish first beetle cultures</b> * start 2x HD and 2x LD cultures (W1) * brief intro to allometry field trip		<b>Data collection</b> <b>field trip Sat. Sept. 14</b>		
2	Sept 17, 19	*Start 2x HD and 2x LD cultures (W2)	<b>Plant seeds</b> *start planning study (students should read about topic before next week)			
3	Sept 24, 26	*Start 2x HD and 2x LD cultures (W3) *Count larvae from Week 1	* thin plants * finish study plan (TA approval) * assign herbivory treatments	<b>Introduce topic in lab: study design, analysis</b>		
4	Oct 1, 3	*Start 2x HD and 2x LD cultures (W4) *Count larvae from Week 2	*Pollination for 4 days/plant	*Analysis	<b>Establish fruit fly cultures</b>	
5	Oct 8, 10	*Start 2x HD and 2x LD cultures (W5) *Count larvae from Week 3		<b>Report due</b>	* remove adult flies * add 2-4 drops water if media is dry	<b>Design experiment</b> * choose behavior and organism * think about question
6	Oct 15, 17 *Oct. 14 Thanksgiving	*Start 2x HD and 2x LD cultures (W6) *Count larvae from Week 4			* count all offspring in vials A,B,C * count number, sex and phenotype of offspring in vial D * introduce analysis	* complete study design * schedule data collection
7	Oct 22, 24 <b>Lecture Midterm Oct 24 evening</b>	*Count and weigh all larvae, pupae and adults from all vials (week 6 will only be 1 week old) *introduce analysis		<b>Report returned</b>	*Analysis and time in lab to work on assignment	
8	Oct 29, 31 <b>Mid-sem TA eval</b>	*analysis and time in lab to work on assignment	* collect and compile data * data analysis		<b>Report due</b>	
9	Nov 5, 7	<b>Report due the day after your lab by midnight</b> (incorp. feedback from FF assn.)	* Lab time for analysis and assignment		<b>Report returned</b> (early so students have feedback for beetles)	
10	Nov 12, 14	<b>Reading week: no labs (labs open for students)</b>				
11	Nov 19, 21	<b>Report returned</b>	<b>Report due the day after your lab by midnight</b> (incorp. feedback from Beetle assn.)			
12	Nov 26, 28					
13	Dec 3, 5		<b>Report returned</b>			<b>Oral presentations</b>

## LAB ASSIGNMENTS

The lab portion of the course accounts for 35% of the course grade. Students **MUST** pass the lab to pass the course. All lab assignments are due **at the start** of your regularly scheduled laboratory during the weeks indicated below, except for the density effects and herbivory effects projects, which are due the day after your lab by midnight to allow time to incorporate feedback from the previous assignment. **Late assignments will be accepted at most 24 hours after the due date with a 10% penalty. Assignments submitted more than 24 hours past the due date can be submitted for feedback only.**

All of the projects will be completed in informal teams. A portion of your lab grade will count towards “teamwork accountability”, to ensure that all students contribute equally to all projects.

Students missing a lab when data are collected for an assignment require an approval or the assignment cannot be submitted for grades (feedback only).

Ecological allometry (paper)	Due Week 5, return Week 7	4.5%
Bateman’s principle (paper)	Due Week 8, return Week 9	4.5%
Density effects (paper)	Due Week 9, return Week 11	8%
Herbivory effects (paper)	Due Week 11, return Week 13	9%
Animal behavior (group oral report)	Due Week 13	5.5%
Teamwork accountability		3.5%

### At the end of this course you should be able to:

1. Distinguish ecological and genetic (evolutionary) aspects of individuality and describe the associated implications for unitary and modular organisms
2. Characterize the influences of morphology, physiology and behaviour on the life histories of individual organisms and their implications for population growth and adaptation
3. Use understanding of how limited resources, time and opportunity constrain options to generate hypotheses and predictions concerning individual performance
4. Recognize the pervasive influence of body size on all aspects of individual capacity and performance and its consequences for morphology, physiology, behaviour and life histories

5. Explain the roles of physiology and behaviour as mechanisms for contending with variation and uncertainty in abiotic and biotic conditions
6. Critique evolutionary explanations for individual performance with reference to the consequences of the timing of events that affect survival and reproduction for individual fitness
7. Design an effective experiment to test predictions based on an hypothesis
8. Prepare and present an effective oral report with increased confidence
9. Write a coherent, informative report of scientific findings in manuscript style