



**UNIVERSITY OF  
CALGARY**

DEPARTMENT OF BIOLOGICAL SCIENCES  
COURSE OUTLINE

**1. Course:** BIOLOGY 315 - Quantitative Biology I

Lecture Section(s) L01 MWF 14:00-14:50 ENE 243 WINTER 2020  
**Instructor(s):** Dr. Jeremy Fox BI 260 403-220-5275 jefox@ucalgary.ca

D2L Course: BIOL 315 L01 - (WINTER 2020) – QUANTITATIVE BIOLOGY I

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

**2. Prerequisites: Biology 241 AND 243**

See section 3.5.C in the Faculty of Science section of the online Calendar

**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:

**Individual Work**

Midterm Exam	25%	<b>6-8 pm, March 3, location TBD</b>
Lab Assignments	25%	
Final Exam (Cumulative)	30%	<b>Scheduled by the registrar</b>
Final portfolio (individual component)	5%	
Participation	5%	
Learning Surveys & Peer Evaluations	1%	

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

Team mini-lab assignments	4%
Final portfolio (team component)	5%

Each piece of work submitted by the student in the categories outline above will be assigned a percentage score. A student's grade is determined by marks for both individual and team work components. 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. 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 the average overall 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 (9% of final grade).

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

Letter Grade	A+	A	A-	B+	B	B-	C+	C	C-	D+	D
Min. Percent Required	95%	90%	85%	80%	75%	70%	65%	60%	55%	50%	45%

**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. March 3, 6-8 pm, location TBD.**

**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 texts:**

1. *The Analysis of Biological Data*, 2<sup>nd</sup> ed. (2014). Michael Whitlock and Dolph Schluter. Available at the Bookstore.
2. *BIOL 315 Lab Skills*. Available on D2L.

**7. Examination Policy:**

Students will be able to use a non-programmable calculator for the midterm and final exams.

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 **ten business 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 submit the Reappraisal of Graded Term work form to the department in which the course is offered within 2 business days of receiving the decision from the instructor. The Department will arrange for a reappraisal of the work within the next ten business days. The reappraisal will only be considered if the student provides a detailed rationale that outlines where and for what reason an error is suspected. 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 (FOIPP). 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.VP Academic, Phone: 403-220-3911 Email: [suvpaca@ucalgary.ca](mailto:suvpaca@ucalgary.ca). SU Faculty Rep., Phone: 403-220-3913 Email: [sciencerep@su.ucalgary.ca](mailto:sciencerep@su.ucalgary.ca). Student Ombudsman, Email: [ombuds@ucalgary.ca](mailto:ombuds@ucalgary.ca).

- 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@su.ucalgary.ca](mailto:sciencerep@su.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.

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

Associate Dean's Approval for  
out of regular class-time activity: \_\_\_\_\_ ORIGINAL SIGNED \_\_\_\_\_ Date: \_\_\_\_\_

			***NOTE THAT SCHEDULE IS TENTATIVE AND SUBJECT TO CHANGE***			
Date	Week	Class	Module	Readings	Lab	Lab assignments
Jan. 13	1	1	Intro to the course	Handouts	no labs this week	no labs this week
Jan. 15	1	2	Descriptive stats, estimation	Ch. 1, 3, 4		
Jan. 17	1	3				
Jan. 20	2	4			Intro to R: skills 1-2	Team mini-assignment 1 due at end of lab
Jan. 22	2	5				
Jan. 24	2	6	Hypothesis testing, inference	Ch. 6, interleaf 3		
Jan. 27	3	7			Summary statistics, random sampling: skills 3-5	No assignment
Jan. 29	3	8				
Jan. 31	3	9	Rules of probability	Ch. 5		
Feb. 3	4	10			Graphing in R: skills 6-9	Individual lab assignment 1 due Feb. 14 at 4:30 pm
Feb. 5	4	11	Proportions and frequencies, binomial & Poisson distns.	Ch. 8, 9, pp. 179-185, 191-193		
Feb. 7	4	12				
Feb. 10	5	13			Sampling distributions, central limit theorem, standard error: skills 10-14	Team mini-assignment 2 due at end of lab
Feb. 12	5	14				
Feb. 14	5	15	Practice session	none		
<b>Feb. 17-21</b>	<b>Term Break, no class</b>					
Feb. 24	6	16	Testing hypotheses about 1-2 means	Ch 10, 11, pp. 328-335	Exploratory data analysis, G-test: skills 15-16	Individual assignment 2; due Mar. 6 at 4:30 pm
Feb. 26	6	17				
Feb. 28	6	18				
Mar. 2	7	19	Practice session	none	Work on team portfolios	Team mini-assignment 3 due at end of lab
Mar. 4	7	20	Experimental design	Ch. 14, interleaves 2, 4, 5, 6		
Mar. 6	7	21				
Mar. 9	8	22			t-tests: skills 17-19	Individual assignment 3; due Mar. 20 at 4:30 pm
Mar. 11	8	23	ANOVA	Ch. 15		
Mar. 13	8	24				
Mar. 16	9	25			ANOVA, Tukey's HSD test, checking assumptions	Individual assignment 4; due Mar. 30 at 4:30 pm
Mar. 18	9	26				
Mar. 20	9	27	Data transformation, permutation tests, bootstrapping	pp. 369-383, 394-398, 639-646		
Mar. 23	10	28				

Mar. 25	10	29			Transformation, permutation: skills 23-24	Individual assignment 5, due Apr. 3 at 4:30 pm
Mar. 27	10	30	Regression and correlation	Ch. 16, pp. 539- 563		
Mar. 30	11	31			Correlation, regression: skills 25-26	Individual assignment 6, due Apr. 13 at 4:30 pm
Apr. 1	11	32				
Apr. 3	11	33				
Apr. 6	12	34			Finish team portfolios	Team portfolios due at end of lab
Apr. 8	12	35	How to lie with statistics	TBA		
<b>Apr. 10</b>	<b>Good Friday, no class</b>					
<b>Apr. 13</b>	<b>Easter Monday, no class</b>				no labs this week	No assignment
Apr. 15	13	36	Practice/review session	none		

<sup>1</sup> The schedule may slightly deviate from this due to the needs of the class. All reading chapter and page numbers refer to the required textbook by Whitlock and Schluter. All lab Skills are found in the required Lab Manual, available at the bookstore.