



## COURSE OUTLINE

### 1. **Course:** BIOL 315, Quantitative Biology I - Winter 2021

Lecture 01: MWF 14:00 - 14:50 - Online

Instructor	Email	Phone	Office	Hours
Dr Jeremy Fox	jefox@ucalgary.ca	220-5275	BI 260	TBA

#### Online Delivery Details:

Some aspects of this course are being offered in real-time via scheduled meeting times. For those aspects you are required to be online at the same time.

To help ensure Zoom sessions are private, do not share the Zoom link or password with others, or on any social media platforms. Zoom links and passwords are only intended for students registered in the course. Zoom recordings and materials presented in Zoom, including any teaching materials, must not be shared, distributed or published without the instructor's permission.

**Lectures will be asynchronous.** Details will be provided on D2L.

**Labs will be synchronous.** The TA will begin each lab session with a short presentation, and then remain available for the rest of the lab session to answer student questions about the lab assignment. Participation in the synchronous lab sessions is strongly recommended but not mandatory. Lab sessions will not be recorded.

The instructor will hold **weekly synchronous open office hours, during schedule lecture times.** These open office hours will not be recorded. Attendance is encouraged but not mandatory.

#### Course Site:

D2L: BIOL 315 L01-(Winter 2021)-Quantitative Biology I

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

**The instructor will make every effort to respond to email inquiries within 24 h, except on weekends and holidays.**

### 2. **Requisites:**

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

#### Prerequisite(s):

Biology 241 and 243.

### 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
Lab assignments	35	Dates to be provided on D2L
Bi-weekly exams (6 @ 10%)	60	Dates to be provided on D2L
Participation (via TopHat)	5	

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.

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

	A+	A	A-	B+	B	B-	C+	C	C-	D+	D
Minimum % Required	95 %	90 %	85 %	80%	75%	70 %	65 %	60%	55%	50 %	45 %

The Participation component of the grade will be completed via TopHat. There will be weekly sets of questions and students will have 1 week to answer each set for participation credit. Over the course of the term, students must answer 75% of the TopHat questions to earn the Participation mark. That mark will not be rounded up (i.e., earning 74.9% will not earn the Participation mark). Students will not be excused from any TopHat questions except in extraordinary circumstances.

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

The university has suspended the requirement for students to provide evidence for absences. Please do not attend medical clinics for medical notes or Commissioners for Oaths for statutory declarations.

In the event that a student legitimately fails to submit any online assessment on time (e.g. due to illness etc...), please contact the course coordinator, or the course instructor if this course does not have a coordinator to arrange for a re-adjustment of a submission date. Absences not reported within 48 hours will not be accommodated. If an excused absence is approved, then the percentage weight of the legitimately missed assignment could also be pro-rated among the components of the course.

Lab assignments that are turned in up to 24 hours after the due date will receive 75% of the marks earned, unless an extension is granted. Lab assignments turned in more than 24 hours after the due date will receive no marks, unless an extension is granted.

Exams that are turned in up to 1 h after the due date will receive 75% of the marks earned. Exams turned in more than 1 h after the due date will receive no marks. Students who are unable to complete an exam on time due to affliction or other valid reason should contact the instructor.

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

There are no scheduled out of class activities for this course.

#### 6. Course Materials:

Required Textbook(s):

Michael Whitlock and Dolph Schluter, *The Analysis of Biological Data* Macmillan.

In order to successfully engage in their learning experiences at the University of Calgary, students taking online, remote and blended courses are required to have reliable access to the following technology:

- A computer with a supported operating system, as well as the latest security, and malware updates;
- A current and updated web browser;
- Webcam/Camera (built-in or external);
- Microphone and speaker (built-in or external), or headset with microphone;
- Current antivirus and/or firewall software enabled;
- Stable internet connection.

For more information please refer to the UofC [ELearning](#) online website.

#### 7. Examination Policy:

Students may consult their notes, textbook, and other course materials during exams.

Exams dates will be as indicated on the schedule posted on the course D2L site. Exams must be completed within 24 h. Students may download the exam from D2L any time within the 24 h window, and must upload their answers to D2L by the end of the 24 h window. Exams will be designed to take approximately 30-60 min. to complete, so the 24 h window should allow more than sufficient time. Exams are open-note, but students must complete each exam on their own without consulting others. During each exam, questions may be directed to the instructor via e-mail.

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 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.

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 Exam:** 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 and receive supports when needed. We encourage you to explore the 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 370, MacEwan Student Centre, [Mental Health Services Website](#)) and the Campus Mental Health Strategy website ([Mental Health](#)).

b. **SU Wellness Services:** For more information, see [www.ucalgary.ca/wellnesscentre](http://www.ucalgary.ca/wellnesscentre) or call [403-210-9355](tel:403-210-9355).

c. **Sexual Violence:** 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](tel:403-220-2208). The complete University of Calgary policy on sexual violence can be viewed at (<https://www.ucalgary.ca/policies/files/policies/sexual-violence-policy.pdf>)

d. **Misconduct:** Academic integrity is the foundation of the development and acquisition of knowledge and is based on values of honesty, trust, responsibility, and respect. We expect members of our community to act with integrity. Research integrity, ethics, and principles of conduct are key to academic integrity. Members of our campus community are required to abide by our institutional [Code of Conduct](#) and promote academic integrity in upholding the University of Calgary's reputation of excellence. Some examples of academic misconduct include but are not limited to: posting course material to online platforms or file sharing without the course instructor's consent; submitting or presenting work as if it were the student's own work;

submitting or presenting work in one course which has also been submitted in another course without the instructor's permission; borrowing experimental values from others without the instructor's approval; falsification/fabrication of experimental values in a report. Please read the following to inform yourself more on academic integrity:

[Student Handbook on Academic Integrity](#)  
Student Academic Misconduct [Policy](#) and [Procedure](#)  
[Research Integrity Policy](#)

Additional information is available on the [Student Success Centre Academic Integrity page](#)

- e. **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.

- f. **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.

- g. **Student Union Information:** [VP Academic](#), Phone: [403-220-3911](tel:403-220-3911) Email: [suvpaca@ucalgary.ca](mailto:suvpaca@ucalgary.ca). SU Faculty Rep., Phone: [403-220-3913](tel:403-220-3913) Email: [sciencerep@su.ucalgary.ca](mailto:sciencerep@su.ucalgary.ca). [Student Ombudsman](#), Email: [ombuds@ucalgary.ca](mailto:ombuds@ucalgary.ca).

- h. **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.

- i. **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.

### Course Outcomes:

- Describe and calculate basic descriptive statistics for measures of central tendency, distribution shape, and spread
- Describe the process of hypothesis testing and given a statement of a research question, construct an appropriate null and alternative hypothesis to use for hypothesis testing
- List biological variables that follow a binomial and Poisson distribution and use the binomial and Poisson probability equations to determine the probability of certain 'events'
- Use the Poisson distribution to test a null hypothesis about the spatial distribution of rare, random 'events' and describe the properties of the Poisson distribution
- Describe and design experiments according to best practices for experimental design in terms of replication, balanced design, blinding, simultaneous control groups, blocking, random sampling, randomization of treatments
- Explain the approach of ANOVA for detecting differences between means by partitioning the total variation in all observations into the variation between treatments/groups and variation within treatments/groups and using the F test to assess whether the variance among treatment means is larger than would be expected given H<sub>0</sub>
- Describe the 4 conceptual steps involved in conducting a permutation test and appropriately conduct,

interpret and report permutation tests and create a bootstrap SE and CI

- Analyze relationships between two continuously scaled variables using linear regression or correlation depending on whether causality can be assumed
- Use R to conduct and interpret the following statistical tests: Linear Regression, ANOVA, Single sample t-test, Paired sample t-test, Permutation (randomization test) and Bootstrapping, G-test as Goodness of Fit or Contingency Analysis, Detect deviations from normality using visual checks (QQ Plots) and formal tests (Shapiro Wilk), Detect deviations from homoscedasticity using visual checks (QQ plots) and formal tests (Bartlett's test)

Electronically Approved - Dec 21 2020 10:37

---

**Department Approval**

Electronically Approved - Dec 23 2020 09:19

---

**Associate Dean's Approval**