



COURSE OUTLINE

1. **Course:** BIOL 241, Energy Flow in Biological Systems - Fall 2023

Coordinator(s)

Name	Email	Phone	Office	Hours
Dr. Brienne Burkinshaw	brianne.burkinsha1@ucalgary.ca	403 220-5350	BI 443	Please email for an appointment

Section(s)

Lecture 01 : MWF 11:00 - 11:50 in ST 140

Instructor	Email	Phone	Office	Hours
Dr. Brienne Burkinshaw	brianne.burkinsha1@ucalgary.ca	403 220-5350	BI 443	Please email for an appointment
Dr. Lars Petersen	lfpeters@ucalgary.ca	TBA	EEEL 235B	TBA
Dr Matt Vijayan	matt.vijayan@ucalgary.ca	403 220-3094	BI 268	By Appointment Only
Dr Samuel Yeaman	samuel.yeaman@ucalgary.ca	403 220-6126	BI 394	TBA
William Huddleston	wrhuddle@ucalgary.ca	403 220-7739	EEEL 235C	Email for appointment

Lecture 02 : MWF 13:00 - 13:50 in ST 140

Instructor	Email	Phone	Office	Hours
Dr. Brienne Burkinshaw	brianne.burkinsha1@ucalgary.ca	403 220-5350	BI 443	Please email for an appointment
Dr. Lars Petersen	lfpeters@ucalgary.ca	TBA	EEEL 235B	TBA
Dr Matt Vijayan	matt.vijayan@ucalgary.ca	403 220-3094	BI 268	By Appointment Only
Dr Samuel Yeaman	samuel.yeaman@ucalgary.ca	403 220-6126	BI 394	TBA
William Huddleston	wrhuddle@ucalgary.ca	403 220-7739	EEEL 235C	Email for appointment

Lecture 03 : MWF 15:00 - 15:50 in ENA 201

Instructor	Email	Phone	Office	Hours
Dr. Brienne Burkinshaw	brianne.burkinsha1@ucalgary.ca	403 220-5350	BI 443	Please email for an appointment
Dr. Lars Petersen	lfpeters@ucalgary.ca	TBA	EEEL 235B	TBA
Dr Matt Vijayan	matt.vijayan@ucalgary.ca	403 220-3094	BI 268	By Appointment Only
Dr Samuel Yeaman	samuel.yeaman@ucalgary.ca	403 220-6126	BI 394	TBA
William Huddleston	wrhuddle@ucalgary.ca	403 220-7739	EEEL 235C	Email for appointment

To account for any necessary transition to remote learning for the current semester, courses with in-person lectures, labs, or tutorials may be shifted to remote delivery for a certain period of time. In addition, adjustments may be made to the modality and format of assessments and deadlines, as well as to other course components and/or requirements, so that all coursework tasks are in line with the necessary and evolving health precautions for all involved (students and staff).

In Person Delivery Details:

Lectures will be delivered in-person during the scheduled lecture time. Lectures will not be recorded. Emails will be responded to within 24 hours, except on weekends and holidays.

Laboratories will be delivered in-person during the scheduled laboratory time. Labs will not be recorded. Teaching assistants will be available during the scheduled lab time and by email outside of lab time. Students must attend all their scheduled labs for the duration of each lab and there is no opportunity to make up missed labs. Assignments associated with a missed lab will not be graded. Student concerns should be directed to the Lab Coordinator (wrhuddle@ucalgary.ca)

There are 4 in-person Lecture Assignments that you will complete during lecture time. Please refer to the lecture schedule posted on D2L for the dates of the in-person Lecture Assignments.

The Lecture Midterm Exam will be on Topics 1 to 6. The non-cumulative Lecture Final Exam (scheduled by the Registrar) will be on Topics 7 to 12. Lecture exams are 2-hour, in-person, closed-book assessments of the lecture material.

Laboratory Assignments must be submitted to the D2L Dropbox before the deadline for each assignment. Some lab assessments will be completed during the lab session.

The Lab Exam is a 2-hour, in-person, closed-book assessment of the lab material.

Should the University mandate a shift to online learning, the Lecture Midterm and Final exams, and the Lab exam, will be modified to online assessments on the same dates.

Course Site:

D2L: BIOL 241 - (Fall 2023) - Energy Flow in Biological Systems

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

Equity Diversity & Inclusion:

The University of Calgary is committed to creating an equitable, diverse and inclusive campus, and condemns harm and discrimination of any form. We value all persons regardless of their race, gender, ethnicity, age, LGBTQIA2S+ identity and expression, disability, religion, spirituality, and socioeconomic status. The Faculty of Science strives to extend these values in every aspect of our courses, research, and teachings to better promote academic excellence and foster belonging for all.

The Biological Sciences Equity Committee acknowledges there are persistent barriers that prevent such accessibility and hinder our progress towards EDI. Our representatives (faculty, staff, postdocs, graduate and undergraduate students) are committed to addressing any concerns and work towards proactive solutions that enact necessary change within the department. To submit anonymous questions, comments or concerns regarding EDI related issues, please reach out to our Chair, Arshad Ayyaz (_arshad.ayyaz@ucalgary.ca), or a committee representative of your choice at <https://science.ucalgary.ca/biological-sciences/about/equity-diversity-and-inclusion>

2. Requisites:

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

Prerequisite(s):

Biology 30 or 212 and Chemistry 30 or 212.

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:

Course Component	Weight	Due Date (duration for exams)	Modality for exams	Location for exams
Lecture Assignments ¹	6%	Ongoing		
Career Workshop Activity ²	1%	Ongoing		
Laboratory ³	19%	Ongoing		
Lab Exam ⁴	10%	Ongoing		
Lecture Midterm Exam ⁵	32%	Nov 04 2023 at 02:00 pm (2 Hours)	in-person	TBD
Registrar Scheduled Final Exam ⁶	32%	Will be available when the final exam schedule is released by the Registrar	in person	Will be available when the final exam schedule is released by the Registrar

¹ In-person during your scheduled lecture time. Refer to the schedule on D2L.

² Refer to the schedule on D2L

³ Refer to the schedule on D2L

⁴ On material covered in labs. During lab section the week of November 27.

⁵ On Topics 1-6.

⁶ Non-cumulative exam on Topics 7-12.

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 %	88 %	84 %	80%	76%	72 %	68 %	64%	60%	55 %	50 %

Grades will be reported to two decimal places. Grades will not be rounded, curved or scaled. There is no opportunity for replacement, make-up, bonus, or extra course work. Graded course component weights will not be shifted to other components.

This course will have a Registrar Scheduled Final exam that will be delivered in-person and on campus. [The Final Examination Schedule](#) will be published by the Registrar's Office approximately one month after the start of the term. The final exam for this course will be designed to be completed within 2 hours.

A maximum course letter grade of D+ will result if the student does not:

1. Earn >50% on the weighted **combined average** of the Lecture Midterm and Final Exams
2. Earn >50% on the laboratory component of the course
3. Earn >50% on the Lab Exam

Students must attend all laboratory sessions for the duration of the session. Assignments will not be accepted from students who are absent from the lab in which data were collected without a valid reason. Submissions received up to 48 hours after the deadline will be given a deduction of 50%. Submissions received 48 hours past the deadline may only be assessed for feedback. Students who have more than one unexcused lab absence will not be permitted to write the Lab Exam.

The University of Calgary offers a [flexible grade option](#), Credit Granted (CG) to support student's breadth of learning and student wellness. Faculty units may have additional requirements or restrictions for the use of the CG grade at the faculty, degree or program level. To see the full list of Faculty of Science courses where CG is not eligible, please visit the following website: <https://science.ucalgary.ca/current-students/undergraduate/program-advising/flexible-grading-option-cg-grade>

4. Missed Components Of Term Work:

In the event that a student legitimately fails to submit any online or in-person assessment on time (e.g. due to illness, domestic affliction, 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, or possible exemption and reweighing of components. Absences not reported within 48 hours will not be accommodated. Students may be asked to provide supporting documentation ([Section M.1](#)) for an excused absence, See [FAQ](#).

If an excused absence is approved, options for how the missed assessment is dealt with is at the discretion of the coordinator or course instructor. Some options such as an exemption and pro-rating among the components of the course may not be a viable option based on the design of this course.

5. Scheduled Out-of-Class Activities:

The following out of class activities are scheduled for this course.

Activity	Location	Date and Time	Duration
Midterm	TBD	Saturday, November 4, 2023 at 2:00 pm	2 Hours

REGULARLY SCHEDULED CLASSES HAVE PRECEDENCE OVER ANY OUT-OF-CLASS-TIME-ACTIVITY. If you have a conflict with the out-of-class-time-activity, please contact your course coordinator/instructor no later than **14 days prior** to the date of the out-of-class activity so that alternative arrangements may be made.

6. Course Materials:

Recommended Textbook(s):

Fenton et al., *Biology: Exploring the Diversity of Life, Fifth Canadian Edition* Nelson.

The Fenton et al. text is the official textbook for the course. Alternatively, you may use the appropriate material from OpenStax (Biology 2nd Edition):

Access (for free) at <https://openstax.org/books/biology-2e/pages/1-introduction>

You will also require a lab jacket (\$25), safety glasses (\$11) and scientific calculator (\$20), all available at the University Bookstore.

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:

The Lecture Assignments are open book and you may work with other students during these assessments.

The Lecture Midterm and Final Exams, are closed-book assessments and **no** aides (e.g., electronic devices, notes, etc.) are allowed. Scientific calculators will be allowed. Communication with others during these assessments is **not** allowed.

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 their [website](#) or call [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) or phone at [403-220-2208](#). The complete University of Calgary policy on sexual violence can be viewed [here](#).
- d. **Student Ombuds Office:** A safe place for all students of the University of Calgary to discuss student related issues, interpersonal conflict, academic and non-academic concerns, and many other problems.
- e. **Student Union Information:** [SU contact](#), Email your SU Science Reps: science1@su.ucalgary.ca, science2@su.ucalgary.ca, science3@su.ucalgary.ca,
- f. **Academic Accommodation Policy:**

It is the student's responsibility to request academic accommodations according to the University policies and procedures listed below. The student accommodation policy can be found at: <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Student-Accommodation-Policy.pdf>

Students needing an accommodation because of a disability or medical condition should communicate this need to Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities: <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Accommodation-for-Students-with-Disabilities-Procedure.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, by filling out the [Request for Academic Accommodation Form](#) and sending it to Lisa Gieg by email imgieg@ucalgary.ca preferably 10 business days before the due date of an assessment or scheduled absence.

- g. **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](#)
[Faculty of Science Academic Misconduct Process](#)
[Research Integrity Policy](#)

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

- h. **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.
- i. **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.
- j. **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.

BIOL 241 - Fall 2023 - LECTURE SCHEDULE

Date	Topic
Sept 6	Intro/Topic 1 Classification
Sept 8	Topic 1: Classification
Sept 11	Topic 2: Thermodynamics
Sept 13	Career Services Workshop
Sept 15	Topic 2: Thermodynamics
Sept 18	Topic 2: Thermodynamics
Sept 20	Topic 2: Thermodynamics
Sept 22	Topic 3: Enzymes
Sept 25	Topic 3: Enzymes
Sept 27	Topic 3: Enzymes
Sept 29	Topic 4: Membranes
Oct 2	Topic 4: Membranes
Oct 4	Topic 4: Membranes
Oct 6	Topic 5: Organotrophy
Oct 11	Topic 5: Organotrophy
Oct 13	Topic 5: Organotrophy
Oct 16	Topic 6: Phototrophy
Oct 18	Topic 6: Phototrophy
Oct 20	Topic 6: Phototrophy
Oct 23	Topic 7: Energy Budgets
Oct 25	Topic 7: Energy Budgets
Oct 27	Topic 7: Energy Budgets
Oct 30	Topic 8: Thermoregulation
Nov 3	Topic 8: Thermoregulation
Nov 4	Midterm Exam on Topics 1-6
Nov 6	Topic 9: Locomotion
Nov 8	Topic 9: Locomotion
Nov 10	Topic 9: Locomotion
Nov 20	Topic 10: Reproduction
Nov 22	Topic 10: Reproduction
Nov 24	Topic 10: Reproduction
Nov 27	Topic 11: Population Growth
Nov 29	Topic 11: Population Growth
Dec 1	Topic 12: Ecosystem Energetics
Dec 4	Topic 12: Ecosystem Energetics
Dec 6	Topic 12: Ecosystem Energetics
Dec 9-20	Final Exam on Topics 7-12, scheduled by the Registrar

BIOL 241 - Fall 2023 - LAB SCHEDULE

Week of	Topic
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Sept 4	No labs this week
Sept 11	No labs this week
Sept 18	Lab 1: Introduction to Scientific Investigation
Sept 25	Lab 2: Enzymes - Part 1
Oct 2	Lab 3: Enzymes - Part 2
Oct 9	Lab 4: Eutrophication
Oct 16	Lab 5: Fermentation and Biofuels
Oct 23	Lab 6: Photosynthesis
Oct 30	Lab 7: Harvesting the Eutrophication Experiment
Nov 6	Lab 8: Climate Change
Nov 13	No labs this week
Nov 20	Lab 9: Presentations
Nov 27	Lab Exam

Course Outcomes:

- Apply the fundamentals of thermodynamics to biological systems
- Show how membranes and enzymes are involved in energy transformations in cells
- Illustrate how organisms acquire and transform solar energy into the potential bond energy of organic molecules how organisms transform the potential bond energy of complex organic molecules into usable forms (ATP, NADH, etc.)
- Analyze how organisms differ in the way energy is used for resting and active metabolism
- Differentiate how organisms invest energy into reproduction and how their population size may change over time
- Demonstrate the flow of energy and cycling of nutrients through ecosystems
- Collaborate with peers to describe, design and carry out scientific experiments
- Analyze scientific data collected from scientific experiments (student-conducted experiments and experiments described in the primary literature)
- Produce oral and written reports that communicate scientific information effectively

Electronically Approved - Sep 03 2023 17:15

Department Approval

Electronically Approved - Sep 06 2023 09:04

Associate Dean's Approval