



UNIVERSITY OF CALGARY

DEPARTMENT OF BIOLOGICAL SCIENCES COURSE OUTLINE

1. **Course:** BIOLOGY 241: ENERGY FLOW IN BIOLOGICAL SYSTEMS

Lecture Section(s): L01: MWF 11:00-11:50 ST 140 FALL 2017
L02: MWF 13:00-13:50 ST 140
L03: MWF 15:00-15:50 ENA 201

Laboratories: All labs are in **EEEL 315, 319, 353, 357 and 363**. Labs begin the week of **September 18, 2017**

Course

Co-ordinator W. Huddleston EEEL 235B 403-220-7739 wrhuddle@ucalgary.ca

Undergrad Learning Coordinator

C. Yip EEEL 301A 403-220-6129 cyp@ucalgary.ca

Instructors:

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A Desire2Learn (d2l.ucalgary.ca) site (Biology 241 – Fall 2017 – Energy Flow in Biological Systems) will be maintained throughout the term to provide study material, assignments, background information, readings, biology-related features, and course information.

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

2. **Prerequisites:** BIOLOGY 30 AND CHEMISTRY 30

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

- **Students are responsible for ensuring that their annual course selections are in accord with all Calendar requirements. Students who do not meet these requirements will be deleted from the course.**
- **Credit for both Biology 241 and Biology 205 will not be allowed.**
- **Credit for more than two of Biology 231, 233, 241, 243 will not be allowed. Completion of two of Biology 231, 233, 241, 243 does not guarantee access to Biological Sciences Degree Programmes.**
- This course is **NOT** recommended for those students seeking a general interest overview of the biological sciences.
- Students must earn a minimum of a C- grade in Biology 241 to continue on to Biology 243

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:

In-Class Assignments (details provided in lecture)	5%
On-line quizzes (details provided in lecture)	5%
Midterm Examination (lecture material covered through Oct. 25)	30%
Final Examination (scheduled by the Registrar's Office)	30%
Laboratory component (details given on D2L)	30%

REQUIRED COURSE COMPONENTS

Each piece of work (assignment, laboratory report, midterm test or final examination) submitted by the student will be assigned a percentage score. 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, bearing in mind that a maximum grade of D+ will result if the student does not write and pass (> 50%) the final lab exam, pass (>50%) the laboratory component of the course, or if the weighted average of the midterm

and final lecture exam is not a passing grade (> 50%). Students must attend all laboratory classes; lab assignments will not be accepted from students who were absent without a valid excuse from the lab in which data were collected/distributed. Students who have a substantial number of unexcused lab absences will not be permitted to write the final laboratory exam.

RE-APPRAISAL OF GRADED TERM WORK

A student who feels that a piece of graded term work (term paper, essay, test, etc.) has been unfairly graded may have the paper re-graded as follows. The student shall discuss the work with the instructor **within fifteen days** of being notified about the mark or of the item's return to the class. The result of that reassessment should be given to the student in writing.

The reappraisal of term work may cause the grade to be raised, lowered or to remain the same.

CONVERSION BETWEEN COURSE PERCENTAGE AND LETTER GRADE FOR BIOL 241

Final Grade Scale :

- A+: 95 or higher
- A : 85 and under 95
- A- : 82 and under 85
- B+: 79 and under 82
- B : 76 and under 79
- B- : 72 and under 76
- C+: 68 and under 72
- C : 64 and under 68
- C- : 60 and under 64
- D+: 55 and under 60
- D : 50 and under 55
- 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.3](#) of the University Calendar.
5. **Scheduled out-of-class activities:** Dates and times of approved class activities held outside of class hours.

The mid-term exam is on Saturday, October 28, 2017 1000 - 1200 Locations TBA

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 the BIOL 241 course administrator as soon as possible so that alternative arrangements may be made for you.

6. **Course Materials:** Morris *et al.* 2016. **Biology: How Life Works, 2nd edition.** WH Freeman and Company.
Huddleston, *et al.* 2017. **Biology 241 Laboratory Manual, 2017-2018 edition.** Hayden-McNeil.
- Online Course Components:** BIOL 241 will **not** use online tools outside of those provided by the University course Management system and Top Hat classroom response system. Note: Top Hat may be used in BIOL 241, but will **not** be used for grades.
7. **Examination Policy:** No electronic or written aids (e.g. cell phones, tablets, computers, PDAs, calculators, notes, textbooks) will be allowed during writing of any exams. Students should also read the Calendar, [Section G](#), on Examinations.
8. **Approved Mandatory and Optional Course Supplemental Fees:** Not applicable.
9. **Writing across the curriculum:** 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.
10. **Human studies statement:** If you consent, your course work may be used for research purposes once the course is over. Your responses will remain anonymous and confidential. Grouped data (no individual responses) may be used in academic presentations and publications. Participation in such research is voluntary and will not influence grades in this course. Students' signed consent forms will be withheld from instructors until after final grades are submitted. More information will be provided at the time student participation is requested. See also [Section E.5](#) of the University Calendar.

ETHICS IN THE BIOLOGICAL SCIENCES

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.

11. 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) **Academic Accommodation Policy:** Students with documentable disabilities are referred to the following links: [Calendar entry on students with disabilities](#) and [Student Accessibility Services](#).
- (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 (FOIPP). 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: 220-3911 Email: suvpaca@ucalgary.ca.
SU Faculty Rep. Phone: 220-3913 Email: sciencerep@su.ucalgary.ca; [Student Ombudsman](#)
- (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). Your responses make a difference - please participate in USRI Surveys.

Department Approval _____ ORIGINAL SIGNED _____ Date _____

Associate Dean's Approval for
out of regular class-time activity: _____ ORIGINAL SIGNED _____ Date: _____
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TEXTS: Required: Morris *et al.* 2016. **Biology: How Life Works, 2nd edition.** WH Freeman and Company.
Huddleston *et al.* 2017. **Biology 241 Laboratory Manual, 2017-2018 edition.** Hayden-McNeil.

PREREQUISITES:

Biology 30 and Chemistry 30 are pre-requisites for this course and, therefore, we assume that you have a **working understanding** of topics covered in those courses. Expected knowledge from high school biology and chemistry will be outlined for each section of the course.

LEARNING GOALS/ OBJECTIVES – After completion of this course, the student will be able to:

1. Apply the fundamentals of thermodynamics to biological systems
2. Show how membranes and enzymes are involved in energy transformations in cells
3. 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.)
4. Analyze how organisms differ in the way energy is used for resting and active metabolism
5. Differentiate how organisms invest energy into reproduction and how their population size may change over time
6. Demonstrate the flow of energy and cycling of nutrients through ecosystems
7. Collaborate with peers to describe, design and carry out scientific experiments
8. Analyze scientific data collected from scientific experiments (student-conducted experiments and experiments described in the primary literature)
9. Produce oral and written reports that communicate scientific information effectively

CLASSROOM PERFORMANCE SYSTEM:

Students may be asked to use the classroom performance system, *Top Hat*, in lecture. The calculation of students' course grade is **not** dependent on the use of *Top Hat*. Additional information will be provided in lecture.

COURSE POLICY ON MEDICAL DOCUMENTATION:

If you miss a lab or the lecture midterm exam for medical reasons, the only documentation that will be accepted in BIOL 241 is a completed **Physician/Counsellor Statement form**, which can be downloaded from the following web site:

<http://www.ucalgary.ca/registrar/files/registrar/phycoun.pdf>

Have your physician fill out this form and bring it to the lab coordinator. You have **48 hours** from the date that you missed a lab or midterm exam to submit the completed form.

ACADEMIC ACCOMODATION:

Students are responsible to register with the Student Accessibility Services (MSC 452). Academic accommodation letters need to be provided to the course coordinator, no later than 10 days after being issued by the SAS.

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LECTURE SCHEDULE

<u>Date</u>	<u>Lecture Topic*</u>
Sept. 11	Introduction to Biology 241
Sept. 11 – 29	Part 1. Thermodynamics and Life
Oct. 2 – 6	Part 2. Energy Transformations in Organisms
Oct. 9	Thanksgiving – No lecture
Oct. 11 – 25	Part 2. Energy Transformations in Organisms <i>continued</i>
Oct. 28	Midterm Examination 10:00-12:00
Oct. 25 – Nov. 8	Part 3. Cost of Living: Energy Allocation in Organisms
Nov. 10 – 13	Mid-Term Break – No Lectures. Note that there are no BIOL 241 labs during week of Nov. 6
Nov. 15 – 24	Part 3. Cost of Living: Energy Allocation in Organisms <i>continued</i>
Nov. 27 – Dec. 8	Part 4. Energy Flow and Nutrient Cycling in Ecosystems
Dec. 11 – 21	Final Examinations (scheduled by Registrar's Office)

* Dates for each lecture topic are approximate; a more detailed outline of each lecture topic and assigned readings is provided on Desire2Learn

LAB SCHEDULE

<u>Date (week of)</u>	<u>Lab Topic</u>
Sept. 11	No Labs
Sept. 18	Lab 1 – Scientific Investigation
Sept. 25	Lab 2 – Enzyme Kinetics Part 1
Oct. 2	Lab 3 – Enzyme Kinetics Part 2
Oct. 9	Lab 4 - Eutrophication
Oct. 16	Lab 5 – Fermentation and Biofuels
Oct. 23	Lab 6 - Photosynthesis
Oct. 30	Lab 7 – Eutrophication Data Collection
Nov. 6	NO LABS
Nov. 13	Lab 8 – Presentations
Nov. 20	Lab 9 – Isle Royale
Nov. 27*	LAB EXAM
Dec. 4*	NO LABS

* Dates for labs the week of November 27 and December 4 are misprinted in the BIOL 241 lab manual. Please note that the dates listed here supersede the dates in the lab manual.

RESERVE READING ROOM

Copies of biology texts and other supplements are available in the Reserve Reading Room of the Library. The list of these books will be provided on Desire2Learn.

STUDENT SUPPORT

The Student Success Centre's Writing Support Centre is available to assist students writing assignments and improve writing skills: <http://www.ucalgary.ca/writingsupport/>

The Students' Union Academic Commissioner for Science can be contacted at 403-220-6551, MSC 251.

Safewalk/Campus Security: **403-220-5333**

The University of Calgary calendar can be accessed online at: <http://www.ucalgary.ca/pubs/calendar/>