



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

1. **Course:** PLBI 403, Plant Physiology -- Fall 2018

Instructor Name	Email	Phone	Office	Hours
<i>L01:</i> (MWF 12:00 - 12:50 in ST 131)				
Dae-Kyun Ro	daekyun.ro@ucalgary.ca	403-220-7099	BI 393	Monday 10 - 11 am
Peter Facchini	pfacchin@ucalgary.ca	403-220-7651	BI 396	TBA

Course Site:

D2L: PLBI 403 L01-(Fall 2018)-Plant Physiology

Department of Biological Sciences:

Office: BIO 186
Phone: 403 220-3140
Email: biosci@ucalgary.ca

Note:

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

2. **Requisites:**

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

Prerequisite(s): Biology 371 or 233. Also known as: (formerly Botany 303)

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	Percentage of final grade
Lecture (60%)	
Midterm Exam*	30
Final Exam**	30
Laboratory (40%)	
Assignment 1	5
Assignment 2	10
Assignment 3	5
Assignment 4	5
Assignment 5	10
Assignment 6	5

* In class

** Scheduled by the Registrar's Office

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	90 %	85 %	80 %	77%	73%	70 %	67 %	63%	60%	55 %	50 %

This course has a registrar scheduled final exam.

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/themselves with these regulations. See also [Section E.3](#) of the University Calendar.

5. Scheduled out-of-class activities:

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

6. Course Materials:

Required Textbook(s):

Taiz, L. and Ziegler, E., *Plant Physiology and Development, Sixth Edition*: Sinaur Associates Inc, Sunderland, MA .

7. Examination Policy:

No electronic or written aids (e.g. cell phones, tablets, computers, calculators, notes, textbooks) will be allowed during writing of any exams. (<http://www.ucalgary.ca/pubs/calendar/current/g.html>)

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.

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 fieldwork 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.

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.

1. **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
2. **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 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 or call [403-210-9355](tel: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) or phone at [403-220-2208](tel: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 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](tel: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.

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

Tentative Lecture Schedule

Date	Topic	Instructor
Friday, September 7	Introduction to plant physiology	PJF
Monday, September 10	Xylem transport I	PJF
Wednesday, September 12	Xylem transport II	PJF
Friday, September 14	Xylem transport III	PJF
Monday, September 17	Phloem transport I	PJF
Wednesday, September 19	Phloem transport II	PJF

Date	Topic	Instructor
Friday, September 21	Phloem transport III	PJF
Monday, September 24	Photosynthesis I	PJF
Wednesday, September 26	Photosynthesis II	PJF
Friday, September 28	Photosynthesis III	PJF
Monday, October 1	Photosynthesis IV	PJF
Wednesday, October 3	Respiration and lipid metabolism I	PJF
Friday, October 5	Respiration and lipid metabolism II	PJF
Monday, October 8	Thanksgiving Day	No lecture
Wednesday, October 10	Respiration and lipid metabolism III	PJF
Friday, October 12	Nutrient assimilation I	PJF
Monday, October 15	Nutrient assimilation II	PJF
Wednesday, October 17	Nutrient assimilation III	PJF
Friday, October 19	Review	PJF
Monday, October 22	Midterm Exam	In class, 60 minutes
Wednesday, October 24	Introduction to growth and development	DKR
Friday, October 26	Cell walls	DKR
Monday, October 29	Signal transduction I	DKR
Wednesday, October 31	Signal transduction II	DKR
Friday, November 2	Light and plant development I	DKR
Monday, November 5	Light and plant development II	DKR
Wednesday, November 7	Seed dormancy I	DKR
Friday, November 9	Seed dormancy II	DKR
Monday, November 12	Term Break	No lecture
Wednesday, November 14	Term Break	No lecture
Friday, November 16	Term Break	No lecture
Monday, November 19	Gametophytes	DKR
Wednesday, November 21	Fruit development	DKR
Friday, November 23	Senescence and cell death I	DKR
Monday, November 26	Senescence and cell death II	DKR
Wednesday, November 28	Biotic interactions I	DKR
Friday, November 30	Biotic interactions II	DKR
Monday, December 3	Abiotic stress I	DKR
Wednesday, November 5	Abiotic stress II	DKR
Friday, November 7	Review	DKR

Lab Schedule

Week of	Lab	Topic
September 10	1	Xylem tension
September 17	2	Photosynthesis I
September 24	3	Photosynthesis II
October 1	4	Nitrogen assimilation
October 8	5	Rhizobium set-up
October 15	No lab	
October 22	6	Brassinolide set-up
October 29	7	Brassinolide data collection/ Germination set-up
November 5	8	Germination data collection
November 12	Reading break	
November 19	9	Rhizobium data collection
November 26	No lab	
December 3	No lab	

Course Outcomes

- 1. Describe the physiology of water transport through the xylem of plants
- 2. Describe the physiology of sugar transport through the phloem of plants
- 3. Describe the physiology of photosynthesis in plants
- 4. Describe the physiology of respiration and lipid metabolism in plants
- 5. Describe the physiology of nitrogen fixation and assimilation in plants
- 6. Describe the chemical properties, structural organization, biosynthetic mechanisms of cell-wall components in plants
- 7. Explain the molecular mechanisms of how plants perceive red- and blue-light, delay respective signals, and show light-mediated physiological responses
- 8. Describe six major plant hormones, their signal transductions, and developmental and physiological roles in plants
- 9. Describe the molecular mechanisms of germination, phototropism, gravitropism, and thigmotropism in plants
- 10. Describe the defense mechanisms of plants against various biotic stresses