BIOL 266 – Plant Physiology
Syllabus for Fall 2025 ("202530")

Instructors

Lecture:
Harold Weger
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Laboratory:
Jennifer Russell
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Course Description – BIOL 266 – Plant Physiology – 3:3-3: *This course covers the functioning of plants and their interaction with the environment. Topics will include: photosynthesis, water relations, transport processes, mineral nutrition and assimilation, hormones, and development. *** Prerequisite: BIOL 100 and 101, CHEM 104 ****
** Note: CHEM 104 can be taken concurrently **

There are two (2) UR Courses sites for BIOL 266 (one for the laboratory and one for the lecture).

Territorial acknowledgement: The University of Regina is situated on the territories of the nêhiyawak, Anihšināpēk, Dakota, Lakota, and Nakoda, and the homeland of the Métis/Michif Nation. The Regina campus is on Treaty 4 lands, and Saskatoon classes are on Treaty 6 lands.

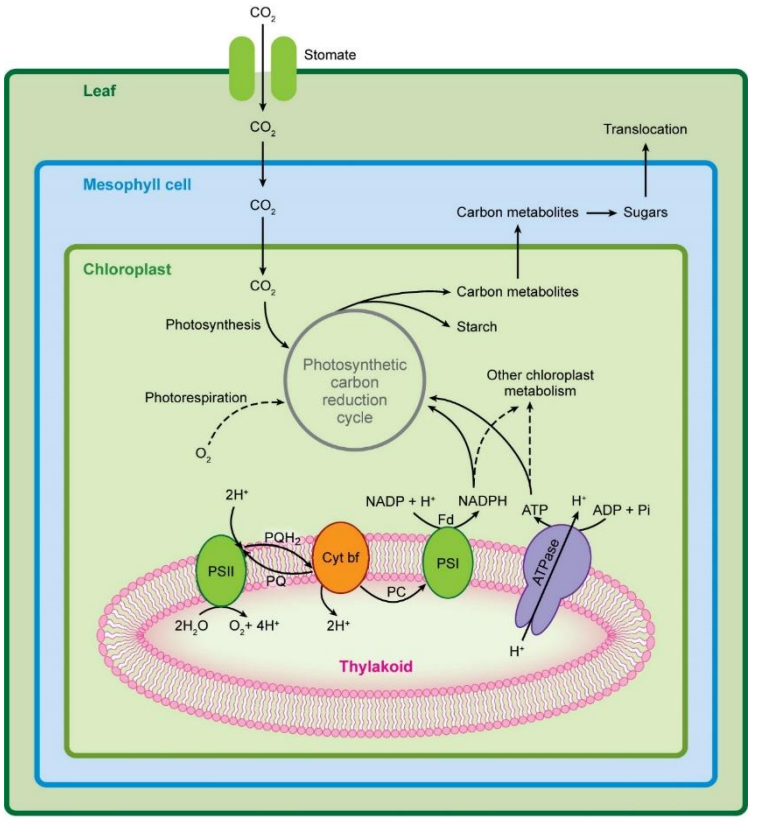
Lectures:

- The lectures are MWF from 10:30-11:20 am, in CL 128.

Laboratories:

- BIOL 266 labs are held in LB 411.2.
- Please check the lab schedule and attend your designated lab section (BIOL 266-09X).

There are <u>two (2) UR Courses sites</u> for BIOL 266 (one for the laboratory and one for the lecture).



An overview of C3 photosynthesis.

Baker NR. 2008.
Annu. Rev. Plant Biol. 59:89–113.

Communication within the Course:

- Please check **your U of R email address** for important information about this course (and your other courses).
- If you prefer to use a different, non-U of R email address (e.g. Gmail), it is possible to set your U of R email address to forward to your preferred email address.
- Emails to the class are also visible via the **News Forum** section of the UR Courses site.

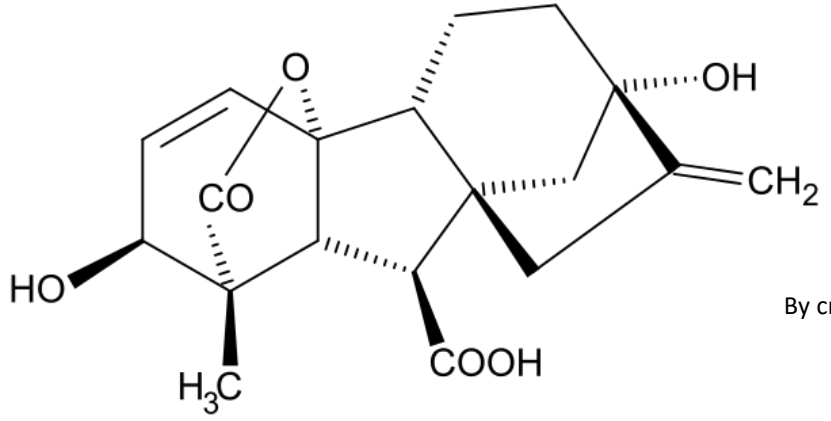
Specialized Accommodations:

Student Accessibility (https://www.uregina.ca/accessibility/index.html) upholds the University's commitment to a diverse and inclusive learning environment by providing services and supports for students based on disability, religion, family status, and gender identity. Students who require these services are encouraged to contact Student Accessibility to discuss the possibility of academic accommodations and other supports as early as possible. For further information, please email accessibility@uregina.ca or phone 306-337-2200.

BIOL 266 Grading Scheme:

Mid-Term Test #1	*15%*
Mid-Term Test #2	*20%*
Laboratory	*25%*
Final Exam	*40%*

The passing grade in BIOL 266 is 50%. There is no requirement to pass the final exam (although passing the exam certainly helps in passing the course).



GA_3, one of the many types of gibberellins ("GA" = gibberellic acid), an important group of plant hormones.

By created by Minutemen using BKchem 0.12 - Own work, Public Domain,

Course Materials:

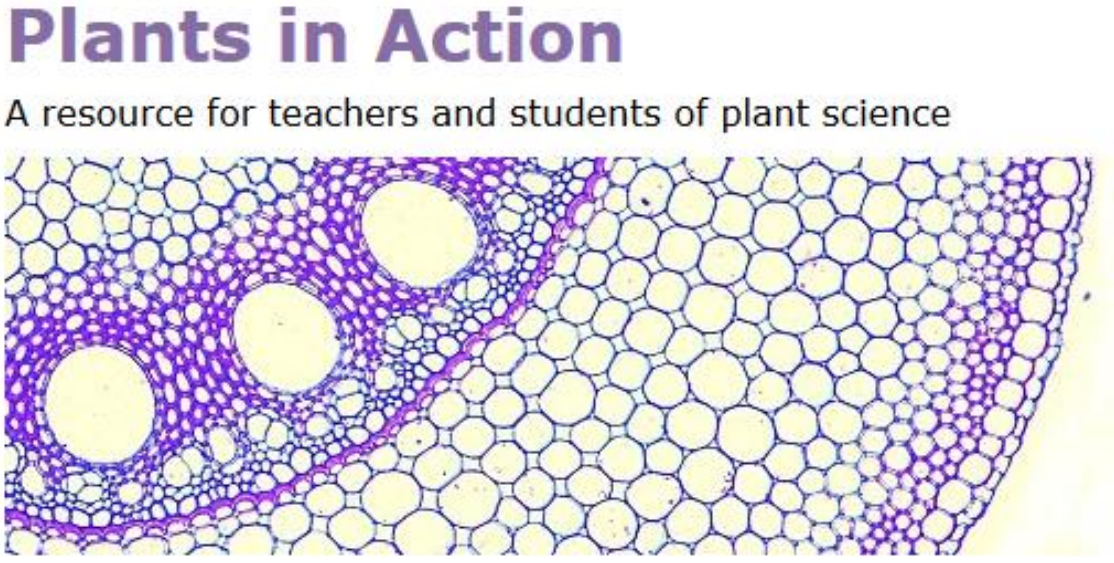
Lab Manual (required): Available on the **BIOL 266 Laboratory UR Courses site**.

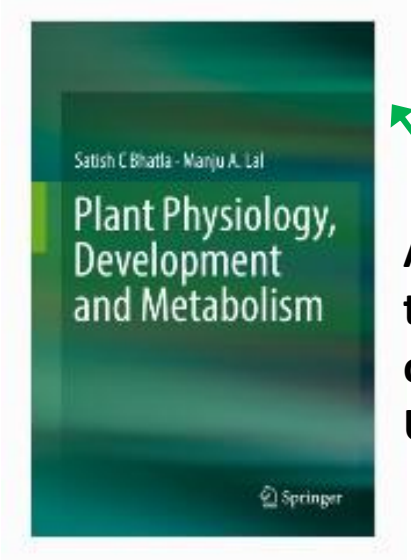
Textbook (optional): **Plants in Action**. This is an open access book, produced via a collaboration between the Australian Society of Plant Scientists and the New Zealand Society of Plant Biologists. There are two editions of the textbook, although the 2nd edition is only a partial revision (it's a work in progress). Both versions are available at:
https://web.archive.org/web/20180313191609/http://plantsinaction.science.uq.edu.au/

https://www.asps.org.au/plants-in-action-2nd-edition-pdf-files

Use of a textbook is optional; there are no assigned readings and material for tests is generated in-class.

Open access course textbook





Another textbook that is open access for U of R students

Lecture Outline and Approximate Order of Topics:

Plant Cell Structure – with a focus on aspects unique to plant cells, including chloroplasts, cell walls, plasmodesmata, vacuoles

Water Relations – water potential and its components, driving forces for water movement, tension-cohesion theory, transpiration, photosynthesis-transpiration compromise, apoplast and symplast, stomates and stomatal conductance

Xylem – tracheids and vessel members, structure of "wood"

Phloem – basic structure, mechanism of long-distance solute transport (pressure-flow)

Growth & Development – general principles

Photoreceptors – with a focus on phytochromes, also including an overview of other photoreceptors

Hormones – overview of auxin, gibberellins, cytokinins, ethylene and abscisic acid

Photosynthesis – pigments, light reactions, enzymatic reactions, carbohydrate synthesis, types/modes of photosynthesis (C3, C4, CAM), water use efficiency

Nitrogen Assimilation – N_2 fixation, nitrate and ammonium assimilation

Mineral Nutrition – essential elements, macronutrients, micronutrients, mineral nutrient deficiencies

Plant Movement – nastic movements, tropisms

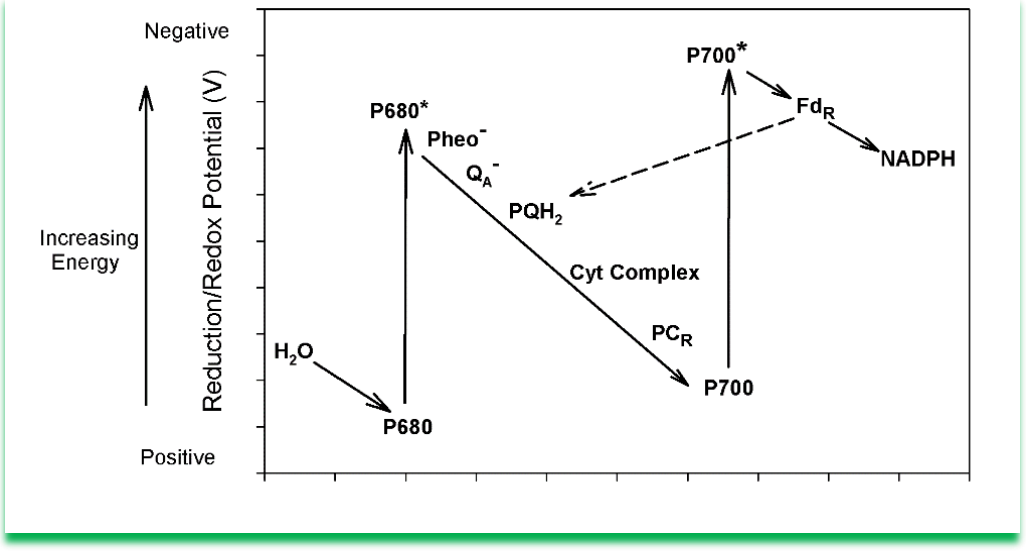
Biological Rhythms – photoperiodism, florigen

Crop Physiology – effects of nutrients on crop yield, Liebig's law of the minimum, law of decreasing productivity

Material to Know for Lecture Tests/Exams – The chart on the previous page represents an *approximate* lecture order. For many of the topics, a standard plant physiology textbook provides much more detail than the lectures, and in a few cases the lectures provide slightly more detail than the textbook. You are responsible for <u>understanding the material at the level of detail provided in the lectures</u>. Material that is not covered in lecture will <u>not</u> appear on a test/exam.

Policies and Procedures

1) The final exam covers the entire course.
2) Attendance at each laboratory session is mandatory. If you miss a laboratory session (with a valid excuse – see Lab Manual), please contact Dr. Russell (jennifer.russell@uregina.ca).
3) This course falls under the Academic Regulations of the University of Regina and the Faculty of Science (these regulations are printed in the General Calendar, available at https://www.uregina.ca/registrar/academic-calendars-and-schedule/undergraduate-calendar.html.
4) The grading scheme for the course is the same for all students in the course. There is no opportunity to boost a grade by doing "extra work", and there will be no adjustments to grade allocations to the various tests and assignments.

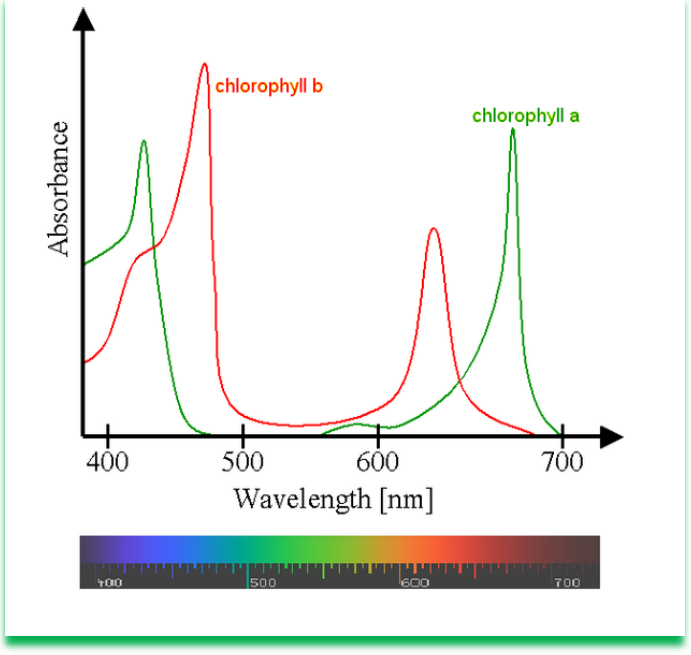


The "Z scheme" of photosynthetic electron transport chain activity.

Policies and Procedures for Missed Lecture Mid-Term Tests and the Final Exam

1) If a student misses a mid-term test, the student should email the instructor immediately (within 48 hours) explaining the situation and providing documentation if requested. A make-up test will be provided only in extenuating circumstances (e.g., urgent medical appointment, personal emergency, counselling, funeral). Students who miss a mid-term test and receive approval for a make-up test, will write a make-up test on December 5 during lecture time. Alternatively, students who are approved for a make-up mid-term test may elect to transfer the weight of the mid-term to the final exam. Students who are not approved for a make-up test will receive a grade of 0% for that mid-term.

2) "Deferred" final exams can only be granted by the Associate Dean, Academic (for Faculty of Science students), or by the Deans and/or Associate Deans of other Faculties or Federated Colleges. Course instructors cannot grant deferred final exams.



Absorbance spectra of chlorophyll a and chlorophyll b in solvent. These two pigments are the most important photosynthetic pigments in vascular plants.

Some Important Dates:

Sept. 2 (T)	First day of lectures
Sept. 3 (W)	**First day of BIOL 266 lectures**
Sept. 17-18 (W, R)	**First day of BIOL 266 labs (check the lab schedule)**
Sept. 15 (M)	Last day to drop a course without a grade of "W"
Sept. 30 (T)	National Day for Truth & Reconciliation; University closed
Oct. 1 (W)	**Mid-term Test #1** (50 minutes)
Oct 17 (F)	CL 126 unavailable; alternative lecture arrangements TBA
Oct. 29 (W)	**Mid-term Test #2** (50 minutes)
Nov. 10 - 15	Fall Break (no classes)
Nov. 17 (F)	Last day to drop a course with a grade of "W"
Dec. 5 (F)	**Last day of classes**; make-up BIOL 266 mid-terms
Dec. T (M)	First day of final exams
Dec. 12 (F)	**BIOL 266 Final Exam;** location TBA (9:00 am; 2.5 hours)

What is on the Two BIOL 266 UR Courses Sites?

Announcements – For both lab and lecture.

Lab Manual – The lab manual is on-line (there is no hard copy) in the BIOL 266 **Lab UR Courses site**.

Laboratory Schedule and Grading Schemes – Available on the BIOL 266 **Lab UR Courses site**; please look at the *schedule* for your lab section.

U of R Resources – Links to various University resources and services.

Other Useful and Important Info is also on the UR Courses sites.

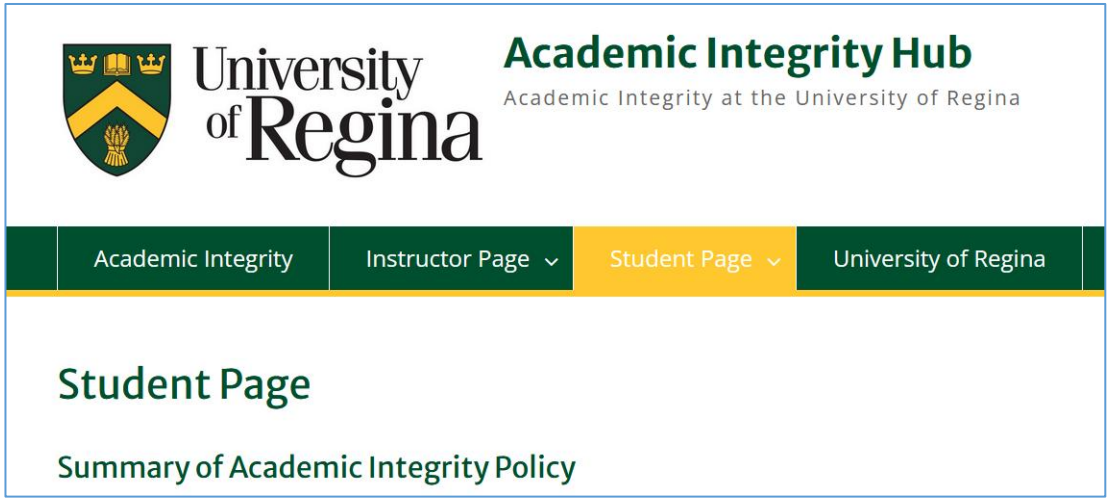
Getting help with UR Courses - There are two ways to get general help with UR Courses sites:

- Email: IT.Support@uregina.ca
- Phone: 306-585-4685

Plant Physiology (BIOL 266) Academic Policies

Unless otherwise stated, all work you submit for evaluation in this course must be your *own original work*. Additionally, any sources you use in completing your work must be properly cited. Copying the work of others, and/or not properly acknowledging the work of others, is plagiarism, which is probably the most common type of academic misconduct.

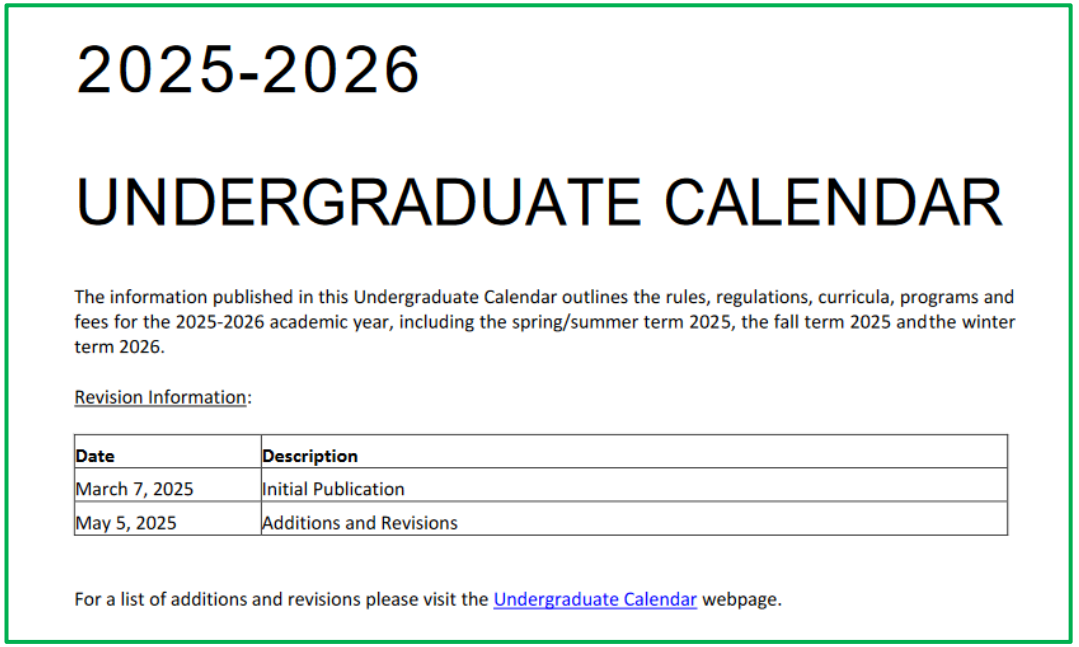
More details about the U of R's academic integrity policies and procedures are available at https://academic-integrity.uregina.ca/



Artificial Intelligence Tools:

The use of generative AI tools in the preparation or completion of assignments or reports is prohibited, and evidence of such use will be reported to the Associate Dean of Science. If you have any questions about what is permissible, please consult with the instructors *before* you submit your work.

Student Code of Conduct (from the Undergraduate Calendar) - https://www.uregina.ca/registrar/academic-calendars-and-schedule/undergraduate-calendar.html.



2025-2026

UNDERGRADUATE CALENDAR

The information published in this Undergraduate Calendar outlines the rules, regulations, curricula, programs and fees for the 2025-2026 academic year, including the spring/summer term 2025, the fall term 2025 and the winter term 2026.

Revision Information:

Date	Description
March 7, 2025	Initial Publication
May 5, 2025	Additions and Revisions

For a list of additions and revisions please visit the Undergraduate Calendar webpage.

Academic Misconduct regulations & Non-academic Misconduct regulations.

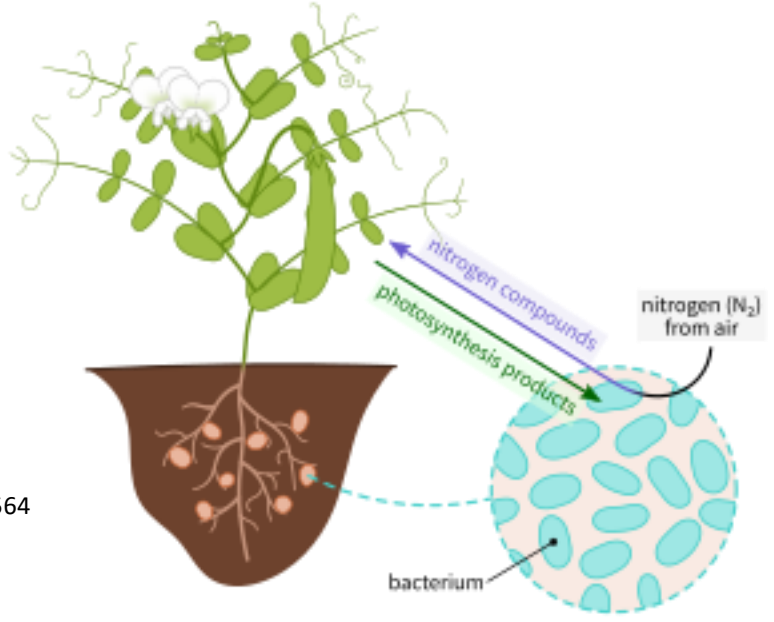
- Both sets of regulations are enforced in this course. Please have a quick read of the regulations in the Undergraduate Calendar.

- Related to non-academic misconduct regulations outlined in the Calendar, the University of Regina also has a *Respectful University policy*: https://www.uregina.ca/policy/browse-policy/policy-GOV-100-015.html

Academic Misconduct

- There are penalties for academic misconduct (and for non-academic misconduct as well).
- Academic misconduct is reported to the Associate Dean of Science (Student Affairs).
- Academic misconduct penalties can range in severity, from zero on a question on an assignment, zero for the assignment, zero for a question on a test/exam, zero on a test/exam, and all the way to a grade of "XF" (= academic misconduct, equivalent to 0%) for the course. "Repeat offenders" risk being expelled from the university.

Symbiosis (mutualism) between a legume and N_2-fixing bacteria.



University of Regina

Resources

Student Central has *lots of information* and resources for students: https://www.uregina.ca/students/

Program/Academic/Pre-Professional Advising

Academic advising (about programs and majors, and about pre-professional programs) is available to both U of R and federated college (First Nations University, Campion College and Luther College) students. For federated college students, advising appointments are made via the appropriate Registrar's Office and/or Academic Advising Office. For U of R students book an advising appointment via the Science Academic Hub (science@uregina.ca; 306-585-4199; LB 238).

BIOL 266 – PLANT PHYSIOLOGY
Fall 2025 Lab Syllabus and Schedule

I respectfully acknowledge that the University of Regina is situated on the territories of the nêhiyawak, Anihšināpēk, Dakota, Lakota, and Nakoda, and the homeland of the Métis Nation.

Lab Instructor: Dr. Jennifer Russell (she/her)
Contact: URCourses
Office: LB 414.4

Labs: Labs will be held in-person in LB 411.2. Please consult the Lab Schedule for exact dates.

Office Hours:
Friday: 9:00-11:00 am
Subject to change

Lab Description: In this lab you will perform two different experiments on the topics of plant water relations and plant pigments/spectrophotometry.

Lab Objectives:
1) To understand basic concepts related to plant physiology
2) To develop wet lab skills
3) To develop skills in bioinformatics analyses

Lab Materials:

Notebook: You are required to purchase a bound notebook for lab work. Notebooks that allow for the addition/removal of new pages will not be accepted. You are free to use old lab notebooks from previous labs, provided that you have adequate space for the new content and that the notebook is **not** also being used for another lab that occurs during the same semester.

Lab Manual: All lab content is available on URCourses.

PPE: Please bring your own lab coat and safety glasses to the lab. Lab coats and safety glasses can be purchased from URStores (in RIC). PPE should be kept in a plastic bag that is only opened INSIDE the lab!

Other Requirements: Please bring a pen (not a pencil) to write with.

Late Assignments Policy: Please see the relevant assignment documents for information regarding late penalties.

Assignment Extension Policy: I understand that things can happen, and so I will be flexible with assignment dates. However, if you require an extension, I do ask that you

contact me, at minimum, 48 hours prior to the due date. If you contact me less than 48 hours before the due date, I may choose not to accommodate late assignments. **There will be no extensions given for quizzes or notebook checks.**

Attendance Policy: Lab attendance is mandatory, and you will not be allowed to complete the course if you have missed any lab sessions without valid reason. In addition, it is imperative that you arrive on time; arriving late may subject you to late penalties. Please contact Dr. Russell if you are not able to make it to your lab session, or if you think you might be late. **If you contact me during/after your scheduled lab session you may be subject to late attendance penalties.**

Evaluation: The lab is worth 25 % of your total grade

Please Note: this breakdown is subject to change with agreement from students

Notebooks: 4.0 %

-Notebook checks will be done three times throughout the semester

Lab Quizzes (3): 4.0 %

Quiz 1 - 1.0 %

Quiz 2 - 1.5 %

Quiz 3 - 1.5 %

Figure Assignment 1: 2.5 %

Figure Assignment 2: 2.5 %

Lab Exam: 9.0 %

Engagement: 3.0 %

Lab Schedule: All dates and topics are subject to change, as necessitated by illness, closures, or other unforeseen circumstances.

Date	Lab Topic/Activity
Cohort A: September 17th/18th **Cohort B: September 24th**	Water Relations Experiment
Cohort A: October 1st/2nd **Cohort B: October 8th**	Water Relations Data Analysis
Cohort A: October 15th/16th **Cohort B: October 22nd**	Plant Pigments
Cohort A: October 29th/30th **Cohort B: November 5th**	Plant Pigments Data Analysis
Cohort A: November 26th/27th **Cohort B: November 26th @ 3:45**	Lab Exam

***Cohort A:** Sections 094, 096, 097

***Cohort B:** Section 095

Quiz Due Dates: All quizzes are due by 11:59 PM on the Monday before your lab.
I reserve the right to change due dates if necessary, but I will always give at least one week's notice for changes. There are no extensions given for lab quizzes.

	Accessible on URCourses	Due Date
Quiz 1	September 3rd	Cohort A: September 15th Cohort B: September 22nd
Quiz 2	September 17th	Cohort A: September 29th Cohort B: October 6th
Quiz 3	October 15th, 2025	Cohort A: October 27th Cohort B: November 3rd

Important Due Dates: I reserve the right to change due dates if necessary, but I will always give at least one week's notice for changes.

Due Date	Assignment
Lab 2	First Notebook Check
Cohort A: October 14th @ 11:59 PM **Cohort B: October 21st @ 11:59 PM**	Figure Assignment 1
Lab 4	Second Notebook Check
Cohorts A and B: November 19th @ 11:59 PM	Figure Assignment 2
094: November 26th @ 2:30 PM **095: November 26th @ 3:45 PM** **096: November 27th @ 8:30 AM** **097: November 27th @ 2:30 PM**	Lab Exam - All cohorts will write in the same week.
Lab Exam	Final Notebook Check (hand in notebook upon arrival to your lab exam)

Academic integrity: All work and grades should result from a student's own understanding and effort. Plagiarism of any kind will be reported to the Associate Dean. This includes, but is not limited to: word-for-word copying of the work of peers (this includes figures and graphs), word-for-word copying of resources and scientific journals, etc. Additionally, you are not permitted to use artificial intelligence programs to write and complete any assignments; this includes, but is not limited to, software like ChatGPT. **As a required component to this course, please complete the Academic Integrity declaration on URCourses.**

Acts of academic misconduct violate academic integrity, and are considered serious offenses by

the University. Examples include, but are not limited to, cheating on tests or exams, plagiarizing, copying from others, falsifying lab results, etc. Instances of academic misconduct will be reported to the Associate Dean Academic for investigation. Full details are provided in the Undergraduate Academic Calendar: https://www.uregina.ca/student/registrar/resources

Accommodations: Students in this course who may have need for specialized accommodations, should contact the Centre for Student Accessibility (Riddell Centre 229, 585-4631), and must discuss their accommodation letter with their relevant instructor.