BIOL 341, Plant Physiology, Winter Term (2026)

CALENDAR DESCRIPTION

The course examines various aspects of plant cell biology, physiology, and biochemistry including carbon and nitrogen metabolism (photosynthesis, respiration, etc.), water relations, mineral nutrition, response to environmental stress, roles of plant hormones, plant biotechnology.

PREREQUISITE BIOL 205/3.0. EXCLUSION No more than 3.0 credits from BIOL 301/3.0; BIOL 341/3.0.

Learning Objectives: The main goal of Biol341 is to help students acquire a comprehension of plant biology from the subcellular to the organismal level. The course explores various topics in plant cell biology, physiology, and biochemistry including primary and secondary metabolism, photosynthesis, respiration, water relations, mineral nutrition, response to environmental stress, roles of plant hormones, and plant biotechnology.

Course Structure: Material is delivered by a combination of lectures, independent text-based reading, lecture notes, and online material. Assessment is via a combination of online assignments and quizzes, in-lecture group quizzes, an oral seminar, and written projects. Grading is performed by instructors, a TA, and/or peer-review.

Learning Hours: The table below provides an **estimate** of hours of study for Biol341. This is for general reference purposes only and is not intended to describe the precise duration of time the course will require. The nature of assignments will vary year to year and thus the allocation of time to various activities will vary accordingly. A 3.0-unit course would normally require a total of 110 to 130 total learning hours (or hours on task) and Biol 341 will fall within that window on any given calendar year. It is prudent to keep in mind however that time commitment to some tasks will vary widely among students depending upon individual aptitude, level of background, etc.

Teaching method		*Average hours per week*	*Number of weeks*	*Total hours*
In-class hours	Lectures	3	12	36
	Seminars			
	Laboratories			
	Tutorials			
	Group learning	3	6	~18
	Individual instruction			
Other	Online activities	3	6	~18
	Private study	4	12	~48
Total learning hours				~120 (typical range 110-130)

Learning Outcomes: By the end of this course, students will be able to:

1. Explain and integrate plant cellular structure and biochemical pathways to describe how metabolism, energy transduction, and transport processes function from the subcellular to the whole-plant level.
2. Analyze the mechanisms and regulation of photosynthesis and respiration, including their biochemical pathways, compartmentation, and responses to internal and environmental factors.

3. Apply principles of water relations and mineral nutrition to predict physiological responses to varying soil, atmospheric, and environmental conditions.
4. Evaluate how plant hormones and signaling pathways coordinate growth, development, and responses to biotic and abiotic stress.
5. Interpret experimental data in plant physiology, including graphs, tables, and primary literature, to draw evidence-based conclusions about plant function.
6. Compare and contrast primary and secondary metabolic pathways, explaining their physiological roles, regulation, and ecological or adaptive significance.
7. Assess the applications and implications of plant biotechnology, including genetic modification and metabolic engineering, in agriculture, industry, and environmental sustainability.

Textbooks/Readings: Required*: Fundamentals of Plant Physiology Taiz et al (2nd edition, 2024 – the 2018 used version 1st edition would also suffice), Sinauer Oxford Press, ISBN: 9780197614167* – hardcopy ~$160, ebook ~$80.

Alternate Textbook: Plant Physiology and Development, 6th edition (2015 or later), by L. Taiz et al, Sinauer Press, ISBN-10: 1605352551, ISBN-13: 978-1605352558 (used copy is fine).

Grading Scheme (tentative, subject to change at start of course)

Group quizzes (2 x 5%)	10%
Seminar project (oral, recorded)	15%
Written assignment	15%
Peer reviews	10%
Online Quizzes (4)	10%
Final Exam	40%

Grading Method: Some components will be graded using numerical percentage marks. Other components will receive letter grades, which for purposes of calculating your course average will be translated into numerical equivalents using the Faculty of Arts and Science Letter Grade Input Scheme. When letter grades are employed, the following scale will be employed for purposes of calculating your course average:

Arts & Science Letter Grade Input Scheme

Assignment mark	**Numerical value for calculation of final mark**
A+	93
A	87
A-	82
B+	78
B	75
B-	72
C+	68
C	65
C-	62
D+	58
D	55
D-	52
F48 (F+)	48

F24 (F)	24
F0 (0)	0

Your course average will then be converted to a final letter grade according to Queen's Official Grade Conversion Scale:

Queen's Official Grade Conversion Scale

Grade	**Numerical Course Average (Range)**
A+	90-100
A	85-89
A-	80-84
B+	77-79
B	73-76
B-	70-72
C+	67-69
C	63-66
C-	60-62
D+	57-59
D	53-56
D-	50-52
F	49 and below

Queen's University is situated on the territory of the Haudenosaunee and Anishinaabek.

Class Attendance: Your presence and participation in class contributes to the knowledge and skills that you will develop throughout this course. We expect that you attend class regularly and participate in class conversations and learning activities. These types of activities provide active engagement, promote a deeper understanding of the course content, and contribute to your success in this course.

Accommodations: Queen's University is committed to working with students with disabilities to remove barriers to their academic goals. Queen's Student Accessibility Services (QSAS), students with disabilities, instructors, and faculty staff work together to provide and implement academic accommodations designed to allow students with disabilities equitable access to all course material (including in-class as well as exams). If you are a student currently experiencing barriers to your academics due to disability related reasons, and you would like to understand whether academic accommodations could support the removal of those barriers, please visit the QSAS website to learn more about academic accommodations or start the registration process with QSAS by clicking ***Access Ventus*** button at **Ventus | Accessibility Services | Queen's (queensu.ca)**

Considerations: Academic Consideration is a process for the University community to provide a compassionate response to assist students experiencing unforeseen, short-term extenuating circumstances that may impact or impede a student's ability to complete their academics. This may include but is not limited to any extenuating circumstance (illness, bereavement, traumatic event, injury, family emergency, etc.) which is short-lived, begins within the term, and will not last longer than 12 weeks - see Academic Consideration webpage for details

(https://www.queensu.ca/artsci/undergraduate/student-services/academic-consideration)

Each Faculty has developed a protocol to provide a consistent and equitable approach in dealing with requests for academic consideration for students facing extenuating circumstances. For more information, undergraduate students in the Faculty of Arts and Sciences should consult the Faculty's webpage on Academic Consideration in Extenuating Circumstances and submit a request via the Academic Consideration Request Portal. Students in other Faculties and Schools who are enrolled in this course should refer to the protocol for their home Faculty.

Students are encouraged to submit requests as soon as the need becomes apparent and to contact their instructor and/or course coordinator as soon as possible once academic consideration has been granted. Any delay in contact may limit the options available for academic consideration. Each instructor has discretion in deciding whether or how to apply the Academic Consideration. For more information on the Academic Consideration process, what is and is not an extenuating circumstance, and to submit an Academic Consideration request, please see the Faculty of Arts and Science's Academic Consideration website. ASO courses include links to information on **Academic Consideration** on your **Course Homepage** in onQ.

Please see the Teaching Team page for contact information for your instructor and TA(s), where relevant. For more information, please see the Senate Policy on Academic Consideration for Students in Extenuating Circumstances.

Late Policy: Late assignments beyond any grace period (without long-term Considerations or Accommodations) will **be penalized 5% per day** (or part thereof) that it is late, including weekends, unless arrangements have been made. Please see the Academic Considerations for Students with Extenuating Circumstances and Accommodations for Disabilities sections of the syllabus for more information.

Grievances: It is the student's responsibility to contact Dr. Snedden within 2 weeks of receiving a grade if there are any problems. Re-grading of any assessment - if agreed to by the instructor - may result in a lower grade than originally assigned.

Academic Integrity: Queen's University is dedicated to creating a scholarly community free to explore a range of ideas, to build and advance knowledge and to share the ideas and knowledge that emerge from a range of intellectual pursuits. Each core value of academic integrity, as defined in the Senate Academic Integrity Policy, gives rise to and supports the next. Honesty appears in presenting one's own academic work, whether in the context of an examination, written assignment, laboratory or seminar presentation. It is in researching one's own work for course assignments, acknowledging dependence on the ideas or words of another and in distinguishing one's own ideas and thoughts from other sources. It is also present in faithfully reporting laboratory results even when they do not conform to an original hypothesis. Further, honesty is present in truthfully communicating in written and/or oral exchanges with instructors, peers and other individuals (e.g. teaching assistants, proctors, university staff and/or university administrators). Trust exists in an environment in which one's own ideas can be expressed without fear of ridicule or fear that someone else will take credit for them. Fairness appears in the proper and full acknowledgement of the contributions of collaborators in group projects and in the full participation of partners in collaborative projects. Respect, in a general sense, is part of an intellectual community that recognizes the participatory nature of the learning process and honours and respects a wide range of opinions and ideas.

However, "respect" appears in a very particular sense when students attend class, pay attention, contribute to discussion and submit papers on time; instructors "show respect by taking students' ideas seriously, by recognizing them as individuals, helping them develop their ideas, providing full and honest feedback on their work, and valuing their perspectives and their goals" ("The Fundamental Values of Academic Integrity", 3rd Edition, p. 8). Ultimately, responsibility is both personal and collective and engages students, administrators, faculty and staff in creating and maintaining a learning environment supported by and supporting academic integrity. Courage differs from the preceding values by being more a quality or capacity of character – "the capacity to act in accordance with one's values despite fear" ("The Fundamental Values of Academic Integrity", 3rd edition, p. 10). Courage is displayed by students who make choices and integrous decisions that are followed by action, even in the face of peer pressure to cheat, copy another's material, provide their own work to others to facilitate cheating, or otherwise represent themselves dishonestly. Students also display courage by acknowledging prior wrongdoing and taking proactive measures to rectify any associated negative impact. All of these values are not merely abstract but are expressed in and reinforced by the University's policies and practices.

Use of Generative Artificial Intelligence (GenAI) Tools: The use of GenAI tools is permitted in the course but only for specific use; such use will be defined in the instructions for each assessment. AI cannot be used for any peer reviews or on the final exam.

Turnitin: This course makes use of Turnitin, a third-party application that helps maintain standards of excellence in academic integrity. Normally, students will be required to submit their course assignments through onQ to Turnitin. In doing so, students' work will be included as source documents in the Turnitin reference database, where they will be used solely for the purpose of detecting plagiarized text in this course. Data from submissions is also collected and analyzed by Turnitin for detecting Artificial Intelligence (AI)-generated text. These results are not reported to your instructor at this time but could be in the future. Turnitin is a suite of tools that provide instructors with information about the authenticity of submitted work and facilitates the process of grading. The similarity report generated after an assignment file is submitted produces a similarity score for each assignment. A similarity score is the percentage of writing that is similar to content found on the internet or the Turnitin extensive database of content. Turnitin does not determine if an instance of plagiarism has occurred. Instead, it gives instructors the information they need to determine the authenticity of work as a part of a larger process. Please read Turnitin's Privacy Policy, Acceptable Use Policy and End-User License Agreement, which govern users' relationship with Turnitin. Also, please note that Turnitin uses cookies and other tracking technologies; however, in its service contract with Queen's Turnitin has agreed that neither Turnitin nor its third-party partners will use data collected through cookies or other tracking technologies for marketing or advertising purposes. For further information about how you can exercise control over cookies, see Turnitin's Privacy Policy. Turnitin may provide other services that are not connected to the purpose for which Queen's University has engaged Turnitin. Your independent use of Turnitin's other services is subject solely to Turnitin's Terms of Service and Privacy Policy, and Queen's University has no liability for any independent interaction you choose to have with Turnitin.

Building a Classroom Community

University is a place to share, question, and challenge ideas. Each student brings a different set of lived experiences. You can help to create a safer, more respectful classroom community by following these guidelines:

- Make a personal commitment to learn about, understand, and support your peers.
- Assume the best of others and expect the best of them.
- Recognize and value the experiences, abilities, and knowledge each person brings to the course.
- Acknowledge the impact of oppression on other people's lives and make sure your words and tone are respectful and inclusive.
- Encourage others to develop and share their ideas.
- Pay close attention to what your peers say/write before you respond. Think through and re-read what you have written before you post online or send your comments to others.
- Be open to having your ideas challenged and challenge others with the intent of facilitating growth.
- Look for opportunities to agree with one another, building on and intentionally referencing peers' thoughts and ideas; disagree with ideas without making personal attacks, demeaning, or embarrassing others.

Copyright of Course Material: Course materials created by the course instructor, including all slides, presentations, handouts, tests, exams, and other similar course materials, are the intellectual property of the instructor. It is a departure from academic integrity to distribute, publicly post, sell or otherwise disseminate an instructor's course materials or to provide an instructor's course materials to anyone else for distribution, posting, sale or other means of dissemination, without the instructor's express consent. A student who engages in such conduct may be subject to penalty for a departure from academic integrity and may also face adverse legal consequences for infringement of intellectual property rights. Copy rights use statement: https://www.queensu.ca/secretariat/policies/administration-and-operations/copyright-compliance-and-administration-policy

Timing of Final Examinations

Once the exam schedule has been finalized, the exam date will be posted on your SOLUS account. The exam dates for each term are listed on the Faculty of Arts and Science webpage under "Important Dates." Student exam schedules for the Fall Term are posted on SOLUS immediately prior to Thanksgiving and on the Friday before Reading Week for the Winter Term. Students should delay finalizing any travel plans until after the examination schedule has been posted. Exams will not be moved or deferred to accommodate employment, travel/holiday plans or flight reservations. For information regarding what is considered extenuating circumstances and qualifications for Academic Consideration, please visit the Faculty of Arts and Science's Academic Consideration webpage.

If you are unable to attend an exam and receive approval for a deferred proctored exam, a further deferral of that exam will not be accommodated.