

Plant Physiology PLNT/BIOL 3400



University of Manitoba

**Faculty of Agricultural and Food Sciences
Department of Plant Science**

**Faculty of Sciences
Department of Biological Sciences**

Plant Physiology PLNT/BIOL 3400

COURSE DETAILS

Course Title & Number: Plant Physiology PLNT/BIOL 3400

Number of Credit Hours: 3

Class Times & Days of Week: Class: 12:30 pm - 1:20 pm MWF, Lab: 2:30-5:30 MT

Location for classes/labs/tutorials: On line delivery via Zoom

Instructor Contact Information

Instructor(s) Name: Dr. Stasolla and Dr. Renault

Preferred form of Address : name

Office Location: Stasolla (Agriculture Bld. 225); Renault (Duff Roblin, W479)

Office hours availability: please email instructor

If you have any questions related to COVID-19 and the vaccine, please contact:
safereturn@umanitoba.ca

Course Delivery

The course will be **delivered on line- via Zoom**. Students are expected to download the Zoom App (free) to participate to classes and labs. **Lectures and labs will be synchronous.**

Lectures **will be recorded on Zoom and made available on requests in the events of technical issues with the connection.**

Course technology requirements

Students must ensure they satisfy the following minimum technological requirements:

- A computing device to create and edit documents,
- An internet connection capable of streaming videos and downloading software,
- Access to a reliable webcam and microphone

Course Description

An integrative view of major physiological processes in plants, spanning the biochemical, cellular, tissue, organ and whole plant levels of organization. The focus will be on photosynthesis, respiration, plant water relations, plant mineral nutrition, and the role of hormonal and extrinsic factors in the regulation of plant growth.

PLNT 3400 – BIOL 3400 is a key course in plant biology because it explores how physiological processes affect plant behavior. Therefore, in order to understand how plants respond to the environment it is important to appreciate plant physiology. Any student interested in having a general knowledge in plant biology should take this course

The course, which covers basic physiological processes related to vegetative and reproductive growth of plants, is important for understanding how plants “work”. Therefore, it complements information covered by other disciplines of the curriculum, including agronomy, plant pathology, plant ecology, genetics and breeding.

Course information

The course will cover the following aspects/events:

I – Photosynthesis

The capture of light energy and its conversion into organic compounds
Photorespiration and photosynthetic processes
Photosynthetic efficiency: C 3 and C 4 plants
Solute transport and assimilate partitioning

II – Respiration

Function of respiration
Factors affecting respiration

III – Control of growth and development

Plant hormones: Auxins, gibberellins, cytokinins, abscisic acid and ethylene

IV – Plant water relations

Properties of water
Water potentials
Water transport in plants
Transpiration

V – Mineral nutrition

Essential elements
The soil: reservoir of nutrients
Membrane transport processes
Nutrient uptake and transport
Function and deficiency symptoms

VI– External factors and plant growth

Plant movements (tropisms and nastic responses)
Measuring time

The course information will be reviewed in more details during the first day of class.

Course goals

The goals of the course are:

- 1) to make students aware of basic aspects of plant physiology and appreciate how structure relates to function
- 2) to encourage a multidisciplinary approach to understand plant behavior
- 3) to understand how any plant response and behavior is governed by plant physiology
- 4) to have an appreciation of how biological processes interact to trigger a response

Learning outcomes

- 1) Ability to critically analyze and summarize scientific information
- 2) Ability to deliver information effectively through written communication
- 3) Creativity in testing specific hypothesis using a multidisciplinary approach
- 4) Ability to prioritize information

Using Copyrighted Material

Please respect copyright. We will use copyrighted content in this course. I have ensured that the content I use is appropriately acknowledged and is copied in accordance with copyright laws and University guidelines. Copyrighted works, including those created by me, are made available for private study and research and must not be distributed in any format without permission. Do not upload copyrighted works to a learning management system (such as UM Learn), or any website, unless an exception to the Copyright Act applies or written permission has been confirmed. For more information, see the University's Copyright Office website at <http://umanitoba.ca/copyright/> or contact um_copyright@umanitoba.ca.

Recording Class Lectures and Labs

Dr. Renault and Dr. Stasolla and the University of Manitoba hold copyright over the course materials, presentations and lectures which form part of this course. **No audio or video recording of lectures or presentations is allowed in any format, openly or surreptitiously, in whole or in part without permission from Dr. Renault and Stasolla. Course materials (both paper and digital) are for the participant's private study and research.**

Textbook

L.Taiz and E. Zeiger, Plant Physiology, Fifth Edition, 2010 (required), and lab handouts created by instructors (required).

Course technology

It is the general University of Manitoba policy that all technology resources are to be used in a responsible, efficient, ethical and legal manner. The student can use all technology in classroom setting only for educational purposes approved by instructor and/or the University of Manitoba Student Accessibility Services. Student should not participate in personal direct electronic messaging / posting activities (e-mail, texting, video or voice chat, wikis, blogs, social networking (e.g. Facebook) online and offline "gaming" during scheduled class time. If student is on call (emergency) the student should switch his/her cell phone on vibrate mode and leave the classroom before using it.

Class communication

The University requires all students to activate an official University email account. For full details of the Electronic Communication with Students please visit:

https://umanitoba.ca/admin/governance/governing_documents/community/electronic_communication_with_students_policy.html

Please note that all communication between myself and you as a student must comply with the electronic communication with student policy:

(http://umanitoba.ca/admin/governance/governing_documents/community/electronic_communication_with_students_policy.html). You are required to obtain and use your U of M email account for all communication between yourself and the university.

Expectations

Students are expected to join Zoom at least 5 min prior to the start of the class. The instructors will start Zoom meetings 10 min before class. The instructor will be available for 10 min after class for questions. We will treat you with respect and would appreciate the same courtesy in return. See Respectful Work and Learning Environment Policy. A large part of my teaching practice includes the use of questions in class. We expect students to respond but we do not expect perfection.

All students are required to respect copyright as per Canada's Copyright Act. Staff and students play a key role in the University's copyright compliance as we balance user rights for educational purposes with the rights of content creators from around the world. The Copyright Office provides copyright resources and support for all members of the University of Manitoba community. Visit <http://umanitoba.ca/copyright> for more information.

Timeline for electronic inquiry response

Please be respectful of the specific reply timelines that faculty members or staff members set for your course. Generally, when a faculty member or staff member receives an electronic inquiry from you they will try to reply within one or two business days of receipt of the email. It is understood that sometimes the reply may come sooner or in some instances later than this, with a normal response envelope between 1-3 business days.

Medical notes

Students who are unable to meet a course requirement due to medical circumstances are currently not required to submit medical notes. However, students are required to contact their instructor or academic advisor by email to inform of the missed work and make arrangements for extensions, deferrals, or make-up assignments. Please follow these guidelines, if you are unable to meet an academic requirement for your courses.

- Contact your instructor for term work such as a class, quiz, midterm/test, assignment, lab;

- Contact an advisor in your faculty of registration for a missed final exam (scheduled in the final examination period);
- Inform your instructor/advisor as soon as possible, do not delay. Note for final exams, students must contact within 48 hours of the date of the final exam.
- Email your instructor/advisor from a U of M email address, and include your full name, student number, course number, and academic work that was missed within 48 hours of the date of the missed examination.

Please note that circumstances that result in missing multiple course assignments/tests/classes may require medical documentation (e.g., Authorized Withdrawal, Tuition Fee Appeal, Leave of Absence, or [accessibility-related accommodations](#)). Students are advised to speak with an [advisor in their faculty/college/school of registration](#) in this case.

Respectful Work and Learning Environment

We recognize that these are unusual circumstances, and that there are some adjustments needed when working virtually. At the same time, we do want to remind you that University policies, such as the **Respectful Work and Learning Environment policy**, still apply, as do basic expectations around how students will engage with each other, and with the University. This means that when participating in classes, online meetings, etc., students are expected to behave professionally, and follow the same basic norms as they would in person, such as being clothed, not being impaired, and participating respectfully. **Essentially, if you would not do it in an in-person class, do not do it in virtual setting.**

http://umanitoba.ca/admin/governance/governing_documents/community/230.html

Section 2.5(c) of the Student Non-Academic Misconduct and Concerning Behaviour Procedure (https://umanitoba.ca/admin/governance/media/Student_Non-Academic_Misconduct_and_Concerning_Behaviour_Procedure_-_2018_09_01.pdf).

Class schedule

This schedule is subject to change at the discretion of the instructor and/or based on the learning needs of the students but such changes are subject to Section 2.8 of the – ROASS- Procedure.

Date	Class Content	Required Readings	Evaluation
Sept 8- Sept 22	Photosynthesis	Textbook	Mid-term and Final
Sept 24- Oct 6	Respiration	Textbook	Mid-term and Final
Oct 8- Oct 20	Control of growth and development	Textbook	Mid-term and final
Oct 22- Nov 5	Plant Water Relations	Textbook	Final
Nov 15- Nov 24	Mineral nutrition	Textbook	Final
Nov 26 - Dec 10	External factors and plant growth	Textbook	Final

Lab schedule

Date	Lab Content	Required Readings	Evaluation
Sept 27-28	Photosynthesis I	Textbook and Lab handout	Group lab assignment due Oct 11-12 (5%)
Oct 4-5	Photosynthesis II	Textbook and lab handout	Group lab assignment due Oct 19-20 (5%)
Oct 18-19	Hormone Tutorial on lab report	Textbook and Lab handout	Group lab report- Plots and introduction (2%) due Oct 18-19
Oct 25-26	Hormone Tutorial on lab report	Lab handout	Group lab report – M&M, results, detailed discussion outline (2%) due Oct 25-26
Nov 1-2	Hormone Tutorial on abstract	Lab handout	Group lab report – Abstract, discussion and references (2%) due Nov 1- 2
Nov 15-16	Hormone Tutorial on lab report	Lab handout	Revise your lab report due Nov 22-23 (19%)
Nov 22-23	Water relation	Textbook and lab handout	Group lab assignment due Nov 29-30 (10%)
Nov 29-30	Nutrient Deficiency- Mineral nutrition	Textbook and lab handout	Quiz Nov 29-30

Attendance is compulsory throughout the lab period. No student is allowed to miss any lab period without a medical certificate (see section medical notes) or the approval of the instructor.

Breakout rooms in Zoom will be used for group work during the teaching lab, students are encouraged to use a webcam.

Course evaluation methods

Due Date	Assessment Tool	Value of Final Grade
12:30 pm, Friday, Oct 22, 2021	Mid-Term Paper	15%
TBD	Final Exam	40%
See lab schedule	Lab assignments/reports	45%

Grading

Letter Grade	Percentage out of 100	Grade Point Range	Final Grade Point
A+	90-100	4.25-4.5	4.5
A	80-89	3.75-4.24	4.0
B+	74-79	3.25-3.74	3.5
B	68-73	2.75-3.24	3.0
C+	62-67	2.25-2.74	2.5
C	56-61	2.0-2.24	2.0
D	50-55	Less than 2.0	1.0
F	Less than 50		0

Reference style

Reference style should be according to the journal **Physiologia Plantarum** (see Citations and References section): <http://physiologiaplantarum.org/instructions-for-manuscrip/>

Assignment description

The mid-term examination will cover material from the following topics: Photosynthesis, Respiration and Hormones. The final examination will cover material from all topics outlined in the course description section. UMLearn quizzes will be used in the examinations. Details will be provided in class.

Assignment grading time

Grades will be available 10 days after the completion of the respective assignment

Late submission policy and important dates

Late Assignments

A penalty of 20% per day will be applied for any late lab assignment or report

Missed Assignments

A 0% grade will be given for any missed lab assignment or report

Missed Exams

A 0% grade will be given for any missed exam

Voluntary withdrawal date

Last day for voluntary withdrawal is **Nov 23rd 2021**. Upon request students will be provided with verbal feedbacks about their performance.

Academic Integrity

Academic integrity is taking responsibility for and being honest with your work and respecting the work of others. Since you are a member of the university community, we want you to learn what that responsibility and honesty entails and how we respect the work of others.

The Faculty of Science continues to uphold high standards of academic integrity. We know that you, our students, support us in this and we count on each and every one of you to do your part.

We will continue to ensure no one is using Covid-19 circumstances as a means to gain an unfair advantage over their fellow students. Thus, as with standard in-person examinations, we expect all students to strictly adhere to instructions from their professors regarding what resources can and cannot be used during the exams, to follow other rules the professors wish to set, and to adhere to the academic conduct standards of the University and Faculty.

To aid professors in assuring that all forms of assessments have been administered fairly, the University will be electronically monitoring all tests, quizzes and examinations, included, but not limited to overseeing chat-rooms, relevant predatory web-sites and, in so doing, we will analyze scholastic evidence of individual exams.

Please view information with regards to academic integrity: **be aware; be proactive; be smart and be honest.**

Academic Integrity Message from Associate Dean Krystyna Koczanski: <https://youtu.be/Ok-lilm4SeE>

The Student Discipline By-Law may be accessed at:

http://umanitoba.ca/admin/governance/governing_documents/students/student_discipline.html

Information regarding academic integrity from the University of Manitoba can be found at:

<https://umanitoba.ca/student-supports/academic-supports/academic-integrity>

Information regarding academic integrity from the Faculty of Science can be found at:

<https://sci.umanitoba.ca/students/undergraduate-students/academic-integrity-2/>

All Faculty members (and their teaching assistants) have been instructed to be vigilant and report all incidents of academic dishonesty to the Head of the Department.

<https://universityofmanitoba.desire2learn.com/d2l/le/content/6606/viewContent/1463719/View>

How to succeed in your science courses?

The Faculty of Science is committed to delivering the high quality education our students have come to expect. We also want to ensure that you set yourself up for success. We want you to succeed!

#1. We recommend that you consider the stated requirements of this course BIOL/PLNT3400.

While we are making reasonable accommodations for students, you will want to plan ahead accordingly and be flexible.

#2. Use the [Registration Revision Period](#) (Sept.8-22, 2021) to evaluate the course syllabus, and the course content. Some courses will have interactive activities and assessments such as tutorials, online labs, and online quizzes at scheduled times throughout the term in addition to/in lieu of examinations. Make sure that your current situation will allow you to participate in all courses to the fullest. *This is particularly important for students who will be joining us from different time zones.*

Some courses may have a mandatory on-campus component. Student safety is very important to us and the University of Manitoba, operating in close collaboration with Manitoba Public Health, has authorized these components. The primary aim of our in-person components is to maximize the education and training of our students whose future is at risk without it. The University of Manitoba is implementing many safety measures to ensure the safety of students

and staff while on campus, such as requiring face masks (three-ply disposable ones), proper hand hygiene, physical distancing, and sanitation of high-touch surfaces with ethanol solution or disinfectant wipes to help mitigate the risks associated with contracting COVID-19.

If you know that you will be unable to participate in an on-campus component because, for example, you are not currently in Winnipeg and are unable to come to Winnipeg, you, or someone you live with, is immunocompromised, or you are simply uncomfortable with attending, you are strongly urged to withdraw from the course during the Registration Revision Period.

Note: during the registration revision period you will be able to drop/add courses without any financial consequence. Speak directly with instructors if you have any questions specific to their course.

#3. Take time to consider the workload associated with the course schedule you are planning. Remote learning has its challenges and your ability to adapt and be flexible in this context is very important. Be realistic about other commitments and distractions that are part of everyday life, and make your course selection decisions accordingly. If you want to discuss anything, the academic advisors are available – email: sciadv@umanitoba.ca to request an appointment.

LEARNER SUPPORT

Writing and Learning Support

The Academic Learning Centre (ALC) offers writing and learning supports to help you throughout your academic program. These supports are offered online during the Covid-19 pandemic.

Make an appointment with an ALC writing tutor who can give you feedback at any stage of the writing process, whether you are just beginning to work on a written assignment or already have a draft. The ALC also has an English as an Additional Language (EAL) specialist available to work with students on improving their English-language academic writing skills.

Consult an ALC learning specialist or attend an academic skills workshop to improve your time management, learning strategies and test-taking strategies. Get support in select courses by making an appointment with an ALC content tutor. The ALC also offers peer-facilitated study groups called Supplemental Instruction (SI) for certain courses that students have typically found difficult. In SI study groups, students ask questions, compare notes, discuss content, solve practice problems, and develop new study strategies in a group-learning format.

In addition to one-to-one and group sessions, you can also find writing and study tip sheets and videos on the ALC website.

Academic Learning Centre services are free for U of M students. For more information, please visit the Academic Learning Centre website at: <http://umanitoba.ca/student/academiclearning/>

Contact the Academic Learning Centre by calling 204-480-1481 or emailing academic_learning@umanitoba.ca.

University of Manitoba Libraries (UML)

Research begins at [UM Libraries](#). [Learn at the Libraries](#) is a great place to start, with information for students on academic writing, how to search the library, evaluating resources, and writing citations. As the primary contact for all research needs, your [liaison librarian](#) can play a vital role when completing academic papers and assignments. Liaisons can answer questions about locating appropriate resources or managing citations, and will address any other concerns you may have regarding the research process. Liaisons can be contacted by email or phone, and are

also available to meet with you online. When working remotely, students can also receive help online through [Ask Us!](#) chat. For further detail about the libraries' services and collections, [visit the Libraries' web site](#). Regularly check our [COVID-19 Update](#) page for available library services and access to resources for Fall 2021.

For 24/7 mental health support, contact the Mobile Crisis Service at 204-940-1781.

Student Counselling Centre

Contact SCC if you are concerned about any aspect of your mental health, including anxiety, stress, or depression, or for help with relationships or other life concerns. SCC offers crisis services as well as individual, couple, and group counselling. *Student Counselling Centre:*

<http://umanitoba.ca/student/counselling/index.html>

474 UMSU University Centre or S211 Medical Services Building

(204) 474-8592

Student Support Case Management

Contact the Student Support Case Management team if you are concerned about yourself or another student and don't know where to turn. SSCM helps connect students with on and off campus resources, provides safety planning, and offers other supports, including consultation, educational workshops, and referral to the STATIS threat assessment team.

<http://umanitoba.ca/student/case-manager/index.html>

520 UMSU University Centre

(204) 474-7423 (Student Support Intake Assistant)

University Health Service

Contact UHS for any medical concerns, including mental health problems. UHS offers a full range of medical services to students, including psychiatric consultation.

University Health Service <http://umanitoba.ca/student/health/>

(204) 474-8411 (Business hours or after hours/urgent calls)

Health and Wellness

Contact our Health and Wellness Educator if you are seeking information on health topics, including physical and mental health concerns, alcohol and substance use harms, or sexual violence. You can also access peer support from a *Healthy U* peer health educator.

Health and Wellness Educator

<https://umanitoba.ca/student/health-wellness/welcome-about.html>

britt.harvey@umanitoba.ca

469 UMSU University Centre

(204) 295-9032

Sexual Violence Resource Centre (SVRC)

Contact SVRC if you have experienced sexual violence or are seeking information about how to help somebody else. SVRC provides inclusive, survivor-centred, trauma-informed services, such as consultation, referrals, safety planning, and a range of on-site supports, including counselling by Klinik.

Sexual Violence Resource Centre

<https://umanitoba.ca/student-supports/sexual-violence-support-and-education>

svrc@umanitoba.ca

537 UMSU University Centre

(204) 474-6562 (Sexual Violence Intake and Triage Specialist)

Students Accessibility Services

If you are a student with a disability, please contact SAS for academic accommodation supports and services such as note-taking, interpreting, assistive technology and exam accommodations. Students who have, or think they may have, a disability (e.g. mental illness, learning, medical, hearing, injury-related, visual) are invited to contact SAS to arrange a confidential consultation.

Student Accessibility Services <http://umanitoba.ca/student/saa/accessibility/>

520 University Centre

204 474 7423

<https://umanitoba.ca/student-supports/accessibility>

Your rights and responsibilities

As a student of the University of Manitoba you have rights and responsibilities. It is important for you to know what you can expect from the University as a student and to understand what the University expects from you. Become familiar with the policies and procedures of the University and the regulations that are specific to your faculty, college or school.

The [Academic Calendar](http://umanitoba.ca/student/records/academiccalendar.html) <http://umanitoba.ca/student/records/academiccalendar.html> is one important source of information. View the sections *University Policies and Procedures* and *General Academic Regulations*.

Grade Appeals

If you have questions about your grades, talk to me. There is a process for term work and final grade appeals. Note that you have the right to access your final examination scripts. See the Registrar's Office website for more information including appeal deadline dates and the appeal form <http://umanitoba.ca/registrar/>

Academic Integrity

You are expected to view the General Academic Regulation section within the Academic Calendar and specifically read the Academic Integrity regulation. Consult the course syllabus or me for additional information about demonstrating academic integrity in your academic work. Visit the Academic Integrity Site for tools and support <http://umanitoba.ca/academicintegrity/>
View the Student Academic Misconduct procedure for more information.

Violent or Threatening Behaviour

http://umanitoba.ca/admin/governance/governing_documents/community/669.html

Sexual Assault

If you experience Sexual Assault or know a member of the University community who has, it is important to know there is a policy that provides information about the supports available to those who disclose and outlines a process for reporting. The Sexual Assault policy may be found at: http://umanitoba.ca/admin/governance/governing_documents/community/230.html

More information and resources can be found by reviewing the Sexual Assault site <http://umanitoba.ca/student/sexual-assault/>

Intellectual Property

For information about rights and responsibilities regarding Intellectual Property view the policy:

https://umanitoba.ca/admin/governance/governing_documents/community/235.html

For information on regulations that are specific to your academic program, read the section in the Academic Calendar and on the respective faculty/college/school web site

<http://umanitoba.ca/faculties/>

Academic Program Questions

Contact an Academic Advisor within our faculty/college or school for questions about your academic program and regulations <http://umanitoba.ca/academic-advisors/>

Student Advocacy

Contact Student Advocacy if you want to know more about your rights and responsibilities as a student, have questions about policies and procedures, and/or want support in dealing with academic or discipline concerns. <http://umanitoba.ca/student/advocacy/>

520 University Centre

204 474 7423

student_advocacy@umanitoba.ca