BIOL 366 – Plant Physiology

UNIVERSITY OF VICTORIA

Course Outline – Spring 2024

Lectures: Tuesday, Wednesday, Friday; 9:30-10:20 a.m. - Cunningham 146
Labs: Tuesday or Wednesday, 2:30-5:20 p.m. - Cunningham 136

INSTRUCTORS: Dr. Jürgen Ehlting (je@uvic.ca) - Course Coordinator
Dr. Gerry Gourlay (she/her) (holmgera@uvic.ca)

STUDENT HOURS: By appointment (in person or through Zoom),
inquire with the lecture instructor whom you would like to meet with.

SENIOR LAB INSTRUCTOR: Dr. Lan Tran (lttran@uvic.ca)

TEACHING ASSISTANT: Daisuke Yamakawa (daisukey@uvic.ca)

COURSE OBJECTIVES:
To provide an understanding of how plants function. Topics include the capture of light energy for growth and metabolism, water relations, plant nutrition, transport processes, plant development and its control, phytohormones, and responses to environmental stimuli. You will learn that plants are very active and responsive to internal and external stimuli. Plant response to the environment will be explored on biochemical, physical, and molecular levels. The laboratory exercises reinforce these concepts and provide practical experience in plant physiology.

INTENDED LEARNING OUTCOMES:
Throughout this course, you will

- recognize key components of classical plant physiology (e.g., water transport and photosynthesis) in relation to plant success and function.
- identify plant molecular signaling cascades, including hormone functions, through the lens of plant development and in responses and reactions to their environment (e.g., plant (a)biotic stress responses).
- actively practice experimental procedures used for plant research to assess general plant physiology.
- accurately read and interpret scientific graphs and figures, both in scientific literature and generated by your own lab-based experiments.

TEXTBOOK:
Taiz et al., **Plant Physiology and Development**, 7th Edition (2022), Sinauer. *Strongly recommended - older editions are also suitable*.

LAB MANUAL:
Biology 366 Plant Physiology - Laboratory Manual 2024 (required - available from the Bookstore)

We acknowledge and respect the lək̓ʷəŋən peoples on whose traditional territory the university stands and the Songhees, Esquimalt and W̱SÁNEĆ peoples whose historical relationships with the land continue to this day.

COURSE FORMAT:
Dr. Gourlay will teach the first half of the course lectures up until Reading Break and Dr. Ehlting will teach the second half. Dr. Tran will be responsible for the lab component of the course. Slide decks for each lecture will be made available on the Brightspace site. **Please be aware that these are outlines, not detailed notes** to help you organize and review the lecture material. It is important to attend lectures and take notes. Additional learning material can also be found on Brightspace. We intend to record lectures (audio and / or video) which will be available on Brightspace.

EVALUATION:

Three non-cumulative exams (based on lectures)	20% each (60% in total)
Lab component (required)	40%

Students must pass both the lecture and the lab by scoring an overall grade of at least 50% in each component.

Lecture Component
Exams will be based on lecture material, but readings from the text will help reinforce the concepts. Exams will be non-cumulative, that is they cover only the material since the previous exam. This is also true for the third exam, which will take place during final exam period, but will only address material since the second midterm.

All exams will be invigilated and will take place in Cunningham 146 ***during regular lecture time*** (on Tuesday Feb 6th, Tuesday Mar 12th, and during the final exam period (date to be determined)), and administered on paper or through Brightspace. If you do not have a device to write the exam, please contact us at the beginning of the course. We will guide you to resources available on campus (e.g., the 'Borrow a Laptop' program from the library). If you are fit to write the exam but should not come to campus (e.g., to prevent the spread of communicable diseases), please contact the instructors as early as possible to discuss options. Please arrange with the Centre for Accessible Learning (CAL) if you require additional academic accommodations (see further down for more details). All exams will be multiple choice/short answer questions to be completed individually. Exams are closed-book, but you are allowed to bring to the exams a ***'cheat-sheet'*** (i.e., a single sheet of paper with as many handwritten notes on both sides as you can make fit). Note, however, that exams are timed and that you will not have sufficient time during the exam to extensively evaluate the study guide you brought in.

There will be ***no supplemental in-course exams***. Please inform the instructors as soon as possible (within one week) if you miss an exam due to unexpected and unavoidable circumstances, or conflicting responsibilities (as detailed here). In this case the evaluation breakdown will be adjusted accordingly, that is the remaining two exams will each be worth 30% of your final grade. Exams that have been missed without excuse will be given a grade of zero marks. Writing at least two lecture exams is a course requirement. Failure to do so will result in a grade of "N" regardless of the cumulative percentage on other elements of the course. Students that obtained a grade of "N" may submit a formal Request for Academic Concession (RAC) and a deferred exam covering the missed lecture material will be organized if the RAC is approved.

Lab Component
The laboratory is worth 40% of the final course grade. You must pass the lab to pass the course. The closed-book final lab exam is a course requirement and will be written in Cunningham 136 during your regular lab section during the week of Mar 25th. ***Please see the laboratory manual for full laboratory policies and details***.

PROPOSED COURSE OUTLINE:

Date	Lecture Topic	Readings (7th ed.)	Lab topics
Jan 08 – 12 (3 lect.)	Introduction Plant cells & anatomy Water relations.	 Ch. 1 Ch. 5, 6	No lab
Jan15 – 19 (3 lect.)	Water relations (continued) Mineral nutrition	 Ch. 7	Introduction to plant morphology, anatomy & physiology
Jan 22 – 26 (3 lect.)	Mineral nutrition (continued) Assimilation of mineral nutrients Symbionts and nutrient uptake	Ch. 8	Mineral nutrition
Jan 29 - Feb 2 (3 lect.)	Photosynthesis	Ch. 9	Plant tissue culture
Feb 5 – 9 (2 lect. + exam)	Photosynthesis (continued) **Tue, Feb 6: Exam 1**	Ch. 10, 11	Water conduction & transpiration
Feb 12 – 16 (3 lect.)	Respiration Transport & storage of carbohydrate	Ch. 12 Ch. 13	Measurement of photosynthesis in C3 & C4 plants
Feb 19-23	**Reading Break- no lectures or labs**		
Feb 26 - 30 (3 lect.)	Plant signal transduction Responses to red light – phytochrome	Ch. 4, 15 Ch16	Plant growth regulators & pigment extraction
Mar 4 - 8 (3 lect.)	Responses to blue and UV light Plant growth regulators, hormones Hormones and plant development	Ch. 16 Ch. 4 Ch.17	Nitrogen fixation
Mar 11 - 15 (2 lect. + exam)	Hormones and plant development (continued) Hormones and tropism **Tue, Mar 12: Exam 2**	Ch. 17 Ch. 17	Seed germination & respiration
Mar 18 - 22 (3 lect.)	Hormones and vegetative growth Photoperiodism Photoperiodism and flowering (continued)	Ch. 19 Ch. 20	Poster presentations
Mar 25 - 29 (3 lect.)	Abiotic stress physiology Biotic stress physiology	Ch.15 Ch. 24	**Final Lab Exam**

Apr 1 - 5 (3 lect.)	Biotic stress physiology (continued) **Exam 3: TBD during final exam period**	No lab

GRADE CONVERSION: A+ 90-100% A 85-89.5% A- 80-84.5%
B+ 77-79.5% B 73-76.5% B- 70-72.5%
C+ 65-69.5% C 60-64.5% D 50-59.5% F <49.5%

Cumulative grades will be rounded to the next integer for the final course grade.

SOME ADVICE TO BE SUCCESSFUL:

Maybe most importantly: Off-task activities (checking email, surfing the internet, checking social media, etc.) during lectures and study time negatively affects students' grades (by more than 10% based on Sana et al., 2013). You are recommended to turn off notifications while studying.

There will be a Q&A forum on Brightspace for course content related questions. This is a good way to connect with your peers: Help and learn from each other! Please ask questions and please help other students by answering questions. Invite others to form a study group. Instructors will follow the conversation and provide answers to questions fellow students cannot answer. We may also post answers to individual inquiries, anonymized and with consent, if we feel the question is of general importance.

Take advantage of student hours to talk to your instructors in person if you have problems that cannot be solved using the above channels. We are here to help.

Exam times can be very stressful. To stay healthy physically and mentally, make sure that you get enough sleep, eat well, exercise and take breaks. Avoid last-minute study panic by working regularly throughout the term: we recommend that you spend at least 1-2 hours studying after each lecture and lab.

Life can happen and it can happen to every one of us. If there is any situation arising that makes it difficult for you to be successful in this class, please come and talk to us. We can work together to find solutions!

ACADEMIC POLICIES AND REGULATIONS:

All course content and materials (including lecture slides, recordings, and exam questions) are made available by instructors for educational purposes and for the exclusive use of students registered in their class. The material is protected under copyright law, even if not marked with a ©. Any further use or distribution of materials to others requires the written permission of the instructor, except under fair dealing or another exception in the Copyright Act. ***Sharing course content*** (such as lecture slides, recordings, exam questions, etc.) through note-sharing sites or other means ***violates UVic's policy on academic integrity***. Violations may result in disciplinary action under the Resolution of Non-Academic Misconduct Allegations policy (AC1300).

Undergraduate policies and academic regulations are described in the UVic Undergraduate Calendar. Please read very carefully the Policy on Academic Integrity, the Academic Concession Regulation/Guidelines and Academic Important dates.

Academic Integrity: Students are required to abide by all academic regulations as described on UVic's academic integrity site, including standards of academic integrity. Violations of academic integrity (e.g. cheating and plagiarism) are considered serious and may result in significant penalties. The exams must be completed **individually** and not with a friend, or classmate, or a group. You are prohibited from sharing any information about the exam with others.

Academic Concession Regulation/Guidelines:

Please refer to the links below when determining what is a 'valid reason' to request an Academic Concession and the process for requesting a concession.

Academic Concessions Regulation and Academic Concession FAQ

Academic Important Dates:

Check here. It is the student's responsibility to attend to Add/Drop dates published in the Calendar (last day to add courses – Jan. 24; last day to drop without failure – Feb. 29). Students must not assume they will be dropped automatically from any course they do not attend. It is the student's responsibility to check their records and registration status.

UVIC SERVICES:

Centre for Accessible Learning - The University of Victoria is committed to creating a learning experience that is as accessible as possible. If you are registered with the Centre for Accessible Learning and anticipate or experience any barriers to learning in this course, please feel welcome to discuss your concerns with CAL advisers. If you are a student with a disability or chronic health condition, you can meet with a CAL advisor to discuss access and accommodations.

Learn Anywhere – provides extensive information and student supports for online technology. This portal helps navigate essential resources, services, learning tools and strategies.

Student Mental Health Supports - In addition to providing both face to face and online mental health resources through our new Student Wellness Centre, a 24x7 phone & online student mental health resource and support program (Support Connect) is available for all UVic students, no matter where you are located, at any time.

Student Wellness - provides a full service, primary health clinic for students, and coordinates healthy student and campus initiatives. They also offer counselling services that can help you make the most of your university experience. They offer free professional, confidential, inclusive support to currently registered UVic students.

Elders' Voices - The Office of Indigenous Academic and Community Engagement (IACE) has the privilege of assembling a group of Elders from local communities to guide students and others in Indigenous ways of knowing and being.

Sexualized Violence Prevention and Response - UVic takes sexualized violence seriously. We encourage students to learn more about how the university defines sexualized violence and its overall approach. If you or someone you know has been impacted by sexualized violence and needs information, advice, and/or support please contact the sexualized violence resource office in Equity and Human Rights (EQHR). If you want to take part in the important prevention work taking place on campus, you can also contact the sexualized violence resource office in EQHR; Sedgewick C119, Phone: 250.721.8021, Email: svpcoordinator@uvic.ca.