

UNIVERSITY OF VICTORIA
Biology 326 – DEVELOPMENT AND GENETICS OF MODEL PLANTS
COURSE OUTLINE - FALL 2026

Lecture: TWF, 1:30-2:20 pm; CUN146 (A01, CRN 10362)

Lab: F, 2:30-5:20 pm; CUN118 (B01, CRN 10364)

Course Instructor: **Dr. Jürgen Ehling**
Office: Cunn. 159a
email: je@uvic.ca

Laboratory Teaching Assistant:
Bethany Robson
Office: CUN 161
email: brobson@uvic.ca

Office hours by inquiry, please email to make an appointment.

Course Description: The genetic basis of anatomy, development, physiology and ecology in model plants such as poplar and *Arabidopsis*. Labs emphasize phenotypic and genetic analysis of plant mutants.

Intended Learning Outcomes: On completion of this course, students should be able to:

- Explain the significance, advantages, and limitations of model plant systems, particularly *Arabidopsis thaliana*, for studying plant development and genetics.
- Describe how *Arabidopsis* is used to investigate organ and tissue development, cellular differentiation, and genetic pathways.
- Describe the major stages and processes of plant embryogenesis, root development, vascular differentiation, leaf development, the vegetative-to-reproductive transition, and flower development.
- Explain key genetic and molecular mechanisms underlying these developmental processes, including the roles of specific genes and mutations.
- Apply genetic and molecular laboratory techniques, including morphological and histological mutant analysis, genomic DNA extraction, and PCR-based genotyping.
- Use basic *in silico* and omics approaches to investigate gene expression and functional genomics in plants.
- Critically assess current research in plant development and genetics, and synthesize and communicate findings from the scientific literature in written and oral formats.
- Work effectively in teams to conduct experiments, analyze and interpret results, and communicate findings.

Resources: There is no required textbook for this course, but background readings in ‘*Plant Biology*’ (by A Smith *et al.*, 2010; Garland Science) and ‘*Plant Physiology and Development*’ (by L Taiz *et al.*, 2023; Oxford University Press) will be helpful.

Attendance is important and you are strongly encouraged to attend all lectures in person. However, be aware that lectures may be recorded to allow students who are not able to attend to watch later. The recording will be posted in BrightSpace. Students who have privacy concerns can contact me and will have the option to limit their personal information shared in the recording. If you have other questions or concerns regarding class recording and privacy please contact privacyinfo@uvic.ca. Lecture slides will also be made available through BrightSpace. BrightSpace will also host lab-related material including manuals, general announcements, and evaluation results. Students should check BrightSpace before coming to lectures and labs.

Evaluation:	Midterm exam	20%
	Essay	20%
	Oral presentation	5%
	Laboratory	25%
	Final exam	30%

Please inform the course coordinator as soon as possible (within one week), if you were unable to submit any of the course component listed above.

Exams will be based on lecture and lab material; only material covered in class or lab will be evaluated but background readings in the textbooks may be helpful. All exams will be invigilated closed-book and timed exams written either on paper or on BrightSpace. The final exam will cover predominantly the material learned after the midterm, but approximately one-third of the final exam will cover material from throughout the course, i.e. it is cumulative. A deferred in-course midterm exam will be arranged if you had to miss the midterm due to unexpected and unavoidable circumstances, or conflicting responsibilities (as detailed [here](#)). If you are also unable to write the deferred midterm with excuse, it will not be included in calculating the course grade and all other course components will be reweighted. Likewise, if you must miss, with excuse, any other course component, the remaining components will be re-weighted proportionally. It is important to note in this context that every single course component must be worth less than 50% of your final grade after reweighing, so you cannot miss too many course components. For example, if you miss the midterm, the weight of the final exam will increase to 37.5% (30/80). However, if you would be unable to submit your essay with excuse in addition to the midterm, your final exam would increase to 50%, (30/60) which is not permitted, and you will receive an N as a course grade regardless of marks obtained in the course components submitted.

Essays submitted late without excuse will be marked down by 10% per late day (e.g. 2 marks down out of 20 possible for each day the essay is submitted late).

To complete the lab section of the course, you must not miss more than two laboratories; completing the lab portion is a course requirement. Labs missed with excuse will not be included in calculating your lab grade and the remaining labs will be reweighted proportionally to calculate your lab grade. Students must pass both the lab and lecture portions of the course to receive a passing grade.

Students must abide by academic regulations as set out in the university calendar. They must

observe standards of scholarly integrity with regards to plagiarism and cheating. Please read the definitions, watch the tragi-comic video, and look at the other information available at this [link](#).

You are permitted to use generative AI in a limited manner for your essay, preparation of slides for your oral presentation, and lab reports. To comply with academic integrity requirements, you must properly cite any AI tool used (the required format will be provided with the essay instructions). You remain fully responsible for all submitted content and must verify factual information and corresponding references against the original literature to ensure that they accurately reflect your reading. In addition, you must include, as an appendix, all prompts and questions submitted to generative AI that contributed to your work. You may use generative AI to learn, but you must not use AI, or any other electronic resources, during exams.

Grading scheme:

A+ (90%-100%), A (85-89.75%), A- (80-84.75%), B+ (77-79.75), B (73- 76.75%),
B- (70-72.75%), C+ (65-69.75%), C (60-64.75%), D (50-59.75%), F (<50%)

Tentative Course Schedule:

DATE	LECT/LAB	TITLE (tentative)
Sept	9-W	(week 1) Course introduction
	11-F	Introduction to the model system <i>Arabidopsis thaliana</i>
	11-F	no lab
	15-T	(week 2) Background on mutants, genetics, and molecular tools
	16-W	Plant reproductive biology, an overview
	18-F	Embryogenesis I; introduction
	18-F	Lab 1 Abiotic stress response of <i>Arabidopsis</i> - Sowing (Greenhouse intro)
	22-T	(week 3) Embryogenesis II; morphology
	23-W	Embryogenesis III; genetics
	25-F	Mutant genotyping techniques
Oct	25-F	Lab 2 Genomic DNA extraction, PCR validation of embryo-lethal mutants I
	29-T	(week 4) Embryogenesis IV; genetics, continued
	30-W	National Day for Truth and Reconciliation (University closed)
	2-F	Embryogenesis V; genetics, continued
	2-F	Lab 2 PCR validation of embryo-lethal mutants II (Gel electrophoresis)
		Lab 3 Chop and stain
	5-T	(week 5) Root development I; morphology
	6-W	Root development II; genetics
	9-F	Root development III; genetics, continued
	9-F	no lab, Happy Thanksgiving
Oct	13-T	(week 6) Vascular differentiation I; cell and tissue types
	14-W	Vascular differentiation II; functional genomics
	16-F	Vascular differentiation III; genetics
	16-F	Lab 4 Vascular differentiation mutants
	20-T	(week 7) MIDTERM 50 minutes
	21-W	Omics' tools in plant development I
	23-F	Omics' tools in plant development II

	23-F	<i>Lab 1 Abiotic stress response of Arabidopsis - Treatments</i>
		<i>Lab 6 Seed sterilization and plating for GUS expression profiling</i>
	27-T	(week 8) Omics tools in plant development III
	28-W	Vegetative to reproductive transition I; vernalization response
	30-F	Introduction to <i>in silico</i> tools
	30-F	<i>Lab 5 Arabidopsis in silico tools</i>
Nov	3-T	(week 9) Vegetative to reproductive transition II; day-length response
	4-W	Vegetative to reproductive transition II; day-length response, continued
	6-F	Essay and presentation introduction. Introduction to GUS expression
	6-F	<i>Lab 6 GUS expression profiling</i>
	10-T	(week 10) Reading Break, no lecture
	11-W	Remembrance Day (University closed)
	13-F	Flower development I; SAM to IM to FM transition
	13-F	<i>Lab 1 Abiotic stress response of Arabidopsis- Conclusion</i>
	17-T	(week 11) Flower development II; ABC model
	18-W	Flower development II; ABC model, continued
	20-F	Leaf development I
	20-F	<i>Lab 7 Flower development in wild type and ABC mutants</i>
	24-T	(week 12) Leaf development II
	25-W	Leaf development III
	27-F 1:30-5:20	Student Presentations
		Essay due
Dec	1-T	(week 13) Stomatal and trichome differentiation I
	2-W	Stomatal and trichome differentiation II
	4-F 1:30-5:20	Student Presentations, Drinks at Felicitas
	TBD	FINAL EXAM (during exam period, Dec 10-23)

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 – Sep 25, last day to drop without failure – Oct 31). Students must not assume they will be dropped automatically from any course they do not attend. It is also the students' responsibility to check their records and registration status.

Diversity, Inclusion, and Resources:

We welcome everyone to learn in this course and we respect every human being, from all ethnic backgrounds, religious beliefs, sexual orientations, genders, socio-economic backgrounds and abilities. UVic is committed to promoting, providing and protecting a supportive and safe learning and working environments for all members. Your health and mental well-being are important for succeeding in this course, so please take care of yourself and take advantage of UVic resources:

Centre for Accessible Learning - The CAL staff are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations. Accommodation letters need to be released to instructors at least seven days in advance of an assessment for accommodations to be applied. Please meet with the instructor(s) about specific concerns if needed.

UVic Learn – provides extensive information and student supports for online technology. This

portal helps navigate essential resources, services, learning tools and strategies.

SupportConnect - is a free, confidential mental health support service for UVic students. Get connected with qualified counsellors, anytime, anywhere. SupportConnect offers short-term solution-focused counselling with the same counsellor. SupportConnect is available 24/7 by phone (1-844-773-1427) and [online](#).

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.

Office of Student life - promoting a safer and more inclusive campus community and supporting student engagement, development and well-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). There are many ways to connect on the [SVRO website](#).