

# Biology 326 – DEVELOPMENT AND GENETICS OF MODEL PLANTS

## COURSE OUTLINE - FALL 2019 (TWF, 1:30pm, CUN146; lab F, 2:30-5:20)

Course Instructors: **Dr. Patrick von Aderkas**                      **Dr. Jürgen Ehling**  
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**Course Description:** Plant cell, tissue and organ differentiation, and the evolution of ecotypes explained through molecular and genetic tools developed using model plants such as Arabidopsis. The genetics of anatomy, development, physiology and ecological differentiation of plants. The role of model species in studies integrating cell biology, anatomy, physiology and ecology. Lab sections will emphasize plant mutants in comparison to wild types.

DATE	LECT/LAB	TITLE (tentative)
<b>Sept</b>	4-W	1. (JE) Introduction to the model system Arabidopsis
	6-F	2. (JE) Background on mutants, genetics, and molecular tools
	<b>6-F</b>	<b>Lab 1</b> <i>Abiotic stress response of Arabidopsis</i>
	10-T	3. (JE) Embryogenesis I
	11-W	4. (JE) Embryogenesis II
	13-F	5. (PvA) Introduction to histology
	<b>13-F</b>	<b>Lab 2 (PvA)</b> <i>Chop and stain</i>
	17-T	6. (JE) Embryogenesis III
	18-W	7. (JE) Embryogenesis IV
	20-F	8. (JE) Mutant Genotyping techniques
	<b>20-F</b>	<b>Lab 3 (JE)</b> <i>PCR validation of embryo-lethal mutants</i>
	24-T	9. (JE) Embryogenesis V
	25-W	10. (JE) Root development I
	27-F	11. (JE) <i>In silico</i> tools
	<b>27-F</b>	<b>Lab 4 (JE)</b> <i>Arabidopsis in silico tools</i>
	<b>Oct</b>	1-T
2-W		13. (PvA) Vascular architecture: cell types
4-F		14. (JE) Vascular architecture: genetics
<b>4-F</b>		<b>Lab 5 (JE)</b> <i>Vascular differentiation</i>
8-T		15. (PvA) Branching I
9-W		16. (PvA) Branching II
11-F		<b>no lecture &amp; no lab:</b> Thanksgiving long weekend
<b>15-T</b>		<b>MIDTERM</b> <i>50 minutes – essay style - 20%</i>
16-W	17. (PvA) Branching III	
18-F	18. (PvA) Leaves	
<b>18-F</b>	<b>Lab 6 (PvA)</b> <i>Write like an angel; edit like a demon I</i>	
22-T	19. (PvA) Internodes	
23-W	20. (PvA) Cell division and elongation in pattern formation	
25-F	21. (JE) Flowering transition I	
<b>25-F</b>	<b>Lab 7 (JE)</b> <i>GUS expression profiling</i>	

	29-T	22. (JE)	Flowering transition II (day-length response)
	30-W	23. (JE)	Flower development I (SAM to IM to FM transition)
<b>Nov</b>	1-F	24. (JE)	Flower development II: ABC model
	<b>1-F</b>	<b>Lab 8 (JE)</b>	<b>Flower development in wild type and ABC mutants</b>
	5-T	25. (PvA)	Nectaries
	6-W	26. (PvA)	From genotype to phenotype
	8-F	27. (PvA)	Plant-insect coevolution: key innovation in the Brassicales
	8-F	<b>no lab</b>	
	11-13	<b>Remembrance Day (11 Nov) and READING BREAK (11-13 Nov)</b>	
	15-F	28. (PvA)	How to make a sublime presentation for the ages
	<b>15-F</b>	<b>Lab 9 (PvA)</b>	<b>Write like an angel; edit like a demon II</b>
	19-T	29. (PvA)	Evolutionary and ecological genomics
	20-W	30. (PvA)	In a common garden
	<b>22-F</b>	<b>1:30-5:20</b>	<b>Student Presentations: Hardcopy of essay due at 1:30 p.m.</b>
	26-T	31. (PvA)	Proteomics
	27-W	32. (PvA)	What virtue in a virtual plant?
	<b>29-F</b>	<b>1:30-5:20</b>	<b>Student Presentations.</b>
<b>Dec</b>	3-T	34.	Current Research, Ehltling lab
	4-W	35.	Current Research, von Aderkas lab; evaluations/CES/review
			Final Exam TBA (essay style - 35 %)

**Required texts:**

M Northey and P von Aderkas 2019 *Making Sense in the Life Sciences: a Student's Guide to Research and Writing*. 3<sup>rd</sup> edition. Oxford University Press, ppbk (\$25-30)

<b>Requirements:</b>	Midterm exam	20%
	Essay	20%
	Oral presentation	5%
	Laboratory	20%
	Final exam	35%

<b>Grading system:</b>	Percentages converted to letter grades				
A+ 90-100	A 85-89	A- 80-84	B+ 77-79	B 73-76	B- 70-72
C+ 65-69	C 60-64	D 50-59	F 0-49		

There will be *no supplemental exams*. No electronic devices will be permitted during any exam. Please note – the midterm cannot be deferred. If you provide a doctor's note, your final mark will be calculated on the basis of the other completed components of the course, and you will not incur any penalty. We assign an incomplete (not a zero) for any missed elements. Failure to complete too many important parts of the course (missed lab assignments, missed midterm) will result in being banned from the final. 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 refer to UVic Academic Calendar.