Western Science

Department of Biology

Biology 3603A Course Outline

1. Course information

Biology 3603A – *Ecophysiology of Plants*. Fall, 2025

Prerequisites: Biology 2601A/B.
Unless you have either the prerequisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

2. Teaching team

Instructor: **Denis Maxwell**
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Office: NCB 223

Teaching Assistant: **Beau Daigneault**
bdaignea@uwo.ca

Lab Coordinator: **Anica Bjelica**
abjelic@uwo.ca

3. Course Syllabus, Schedule, Delivery Mode

This course will introduce you to the physiological responses of plants to their environment along the continuum from stress through acclimation to adaptation. We will discuss how plants cope with a range of stress factors including: high light, low temperature, changes in [CO_2] and nutrient deficiency. As well, you will begin to understand how plants actually sense changes in their environment that alter gene expression and physiology leading to phenotypic and genotypic changes. The course has a strong laboratory component that will help develop a range of transferable skills including collaboration, problem-solving and communication.

Learning Outcomes

Here are the major learning outcomes from the lecture component of the course.

1. the concepts of stress, acclimation, adaptation, homeostasis, photostasis as well as the core principles of thermodynamics
2. the structure and function of the photosynthetic apparatus: physics of light absorption, photosystems, linear electron transport, Calvin Cycle, photorespiration
3. environmental impacts (changes in temperature, light, nutrients) on different components of photosynthesis
4. experimental data (tables, graphs, protein, RNA, DNA blots).
5. the utility of model genetic systems (e.g. Chlamydomonas, Arabidopsis) and the technique of mutagenesis for elucidating the molecular basis of acclimation & adaptation
6. the evolutionary processes that result in adaptation and factors that constrain adaptation (e.g. rubisco active site).
7. the mechanisms photoautotrophs use to adapt to low temperature (enzyme properties, fatty acid biosynthesis)
8. the global nitrogen cycle, redox states of N, nitrogen metabolism, biological nitrogen fixation
9. plant water relations, including concepts of diffusion, osmosis, water potential-adaptation (halophytes)
10. climate change, particularly elevations in CO_2, on plant growth and physiology - CO_2 limitations.....FACE experiments, evapotranspiration
11. plant phenology and the interplay between photoperiod and temperature. The impact of climate change on phenological timing (e.g. effects of temperature)
12. photoperiod: from development (flowering time) to molecular aspects (e.g.

phytochrome structure/function) to the importance of biological clocks
13. interpretation of graphical data.

These outcomes will be evaluated using the formats of short answer (i.e., 3 sentences) and long answer (i.e. 3 paragraphs). This may be done by providing definitions, compare and contrast, analysis of presented data, addressing novel and/or hypothetical situations.

4. Course Materials

There is nothing to buy for the course. We will be using OWL Brightspace extensively. This is where you will find: class notes, textbook PDFs, testable class outcomes, announcements, grades and all information related to the laboratory component of the course.

5. Methods of Evaluation

Component	Worth (%)	Details
Pre-midterm quiz	2	In class (date to be decided)
Term paper	15	A.I. draft due Oct 29. Final version due Nov 10
Midterm Test	25	Oct 20 (in class using laptop)
Laboratory	28	See details below
Final Exam	30	Final exam period with laptop

Midterm test and final exam
Both of these assessments will require you to write short/long answers as well as interpret data.

Term paper
Every student will write a 1500-word essay. You will use A.I. to complete a draft submission and then complete the final submission in your own words. We will discuss the scope of this essay in class.

Laboratory
The laboratory is a substantial component of the course. It will require you to work in groups with three other students. All information pertinent to labs will be posted to Brightspace. Here is a tentative lab schedule (labs start Sept 23/24).

Date	Details	Points
Sept 23/24	Experiment session 1	1
Sept 30/1	No labs	
Oct 7/8	Experiment session 3	1
Oct 14/15	Experiment session 4	1
Oct 21/22	Experiment session 5	1
Oct 28/29	Experiment session 6	1
Nov 4/5	Fall break (no labs)	
Nov 11/12	Data review (in lab)	1
Nov 25/26	Group lab presentations	7
Dec 5	Final group lab report	12
Dec 5	Peer evaluation due	3
	Total marks	**28**

6. Academic Considerations, Accommodations and Accessibility

Academic Considerations
For this course, please reach out to me if you are sick or have extenuating circumstances that make it hard to complete your course work. We should be able to work something out.

Students should familiarize themselves with the Policy on Academic Considerations

Students missing course work for medical, compassionate, or extenuating circumstances can request academic consideration by completing a request at the central academic consideration portal (website above). Note that supporting documentation is always required for academic consideration requests for final examinations.

This policy does not apply to requests for Academic Consideration submitted for attempted or completed work, whether online or in person. The policy also does not

apply to students experiencing longer-term impacts on their academic responsibilities. These students should consult Accessible Education.
For procedures on how to submit Academic Consideration requests, see the the Office of the Registrar's webpage: AcademicConsiderations . All requests for Academic Consideration must be made within 48 hours after the assessment date or submission deadline.

Essential Learning Requirements
Even when Academic Considerations are granted for missed coursework, the following are deemed essential to earn a passing grade: midterm test, lab report, lab presentation, final exam.

Religious Accommodation
When a course requirement conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request accommodation for their absence in writing at least two weeks prior to the holiday to the course instructor and/or the Academic Counselling office of their Faculty of Registration. Please consult University's list of recognized religious holidays (updated annually) at https://multiculturalcalendar.com/ecal/index.php?s=c-univwo.

Accommodation Policies
Students with disabilities are encouraged to contact Accessible Education, which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The policy on Academic Accommodation for Students with Disabilities can be found at:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic Accommodation_disabilities.pdf.

7. Scholastic Offences

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

Use of AI in the course
The use of artificial intelligence (AI) systems (e.g. ChatGPT4) are not allowed during the writing of the midterm or final examination. You will be permitted to use them to help in researching and the preliminary writing of aspects of your term paper and lab report. However, *submitting unedited AI-generated work as one's own creation is academic misconduct*. Doing so will result in you receiving a zero for that assessment.

Plagiarism
Your term papers and lab reports may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (http://www.turnitin.com).

8. Support Services

Please visit the Science & Basic Medical Sciences Academic Counselling webpage for information on adding/dropping courses, academic considerations for absences, appeals, exam conflicts, and many other academic related matters: https://www.uwo.ca/sci/counselling/.

Students who are in emotional/mental distress should refer to Mental Health@Western (https://uwo.ca/health/) for a complete list of options about how to obtain help.

Western is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced sexual or gender-based violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts at

https://www.uwo.ca/health/student_support/survivor_support/get-help.html.