

Biology 3404F Evolution of Plants Fall 2022

1. Course Information

Description: This course introduces the major groups of photosynthetic organisms – formerly all called “plants” (Kingdom Plantae) but now classified in three Domains and numerous Kingdoms. These organisms feed the world, produce many of today's medicines, and provide numerous ecosystem functions. Lectures emphasize diversity, evolutionary relationships and importance, and labs emphasize morphology and recognition.
2 lecture hours, 3 laboratory hours, 0.5 course.

Antirequisite(s): None

Prerequisite(s): A minimum mark of 60% in either Biology 1001A or 1201A and a minimum mark of 60% in either Biology 1002B or 1202B, or a minimum mark of 60% in either of the former Biology 1222 or 1223. Unless you have either the requisites 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 if you are dropped from a course for lacking prerequisites.

Lectures: In person W-Th 1:30-2:20 in NCB-114

[Powerpoints on OWL have slides only, no voice-over]

Labs: In person W (002) and Th (003) 2:30-5:30 in BGS 3000. Lab assignments will be submitted for grading through OWL. **Lab attendance is mandatory** (no grades for labs submitted for which you were absent).

2. Instructor Information

Instructor: Dr. R. Greg Thorn, Department of Biology 3047 Biological & Geological Sciences Building rgthorn@uwo.ca (he/him) 661-2111 ext. 88647 <http://publish.uwo.ca/~rgthorn>

Laboratory Teaching Assistants: Makala Lloyd mlloyd27@uwo.ca (she/her) and Julien Koga jkoga@uwo.ca (he/him)

Office Hours: By appointment via email.

3. Delivery Mode, Learning Outcomes, and Schedule

Delivery mode: This course will be **delivered in person** except as noted in the course schedule.

Contingency plan for an in-person class pivoting to 100% online learning

In the event of a COVID-19 resurgence during the course that necessitates the course delivery moving away from face-to-face interaction, affected course content will be delivered entirely online, either synchronously (i.e., at the times indicated in the timetable) or asynchronously (e.g., posted on OWL for students to view at their convenience). The grading scheme will not change. Any remaining assessments will also be conducted online as determined by the course instructor.

Learning Outcomes

[Implicit in many of these is acquisition of new knowledge in the subject area – remembering and understanding; Bloom's 1-2]

At the end of this course, successful students will be able to:

1. Demonstrate an understanding of phylogenetic analysis (estimation of evolutionary relationships) by recognizing monophyletic and nonmonophyletic groups and interpreting the relationships shown in exemplar phylogenetic trees. [Lecture/lab; Bloom's 2-4]
2. Demonstrate a working knowledge of phylogenetic analyses based on DNA sequence by selecting and obtaining taxon and data sets from online sources, constructing sequence alignments, creating phylogenetic trees from these data using a variety of suitable algorithms, and interpreting and evaluating the trees produced. [Lab; Bloom's 3-5]
3. Create and apply dichotomous keys to identify plants based on morphological features. [Lab; Bloom's 3-6]
4. Demonstrate familiarity with the major groups (phyla) of photosynthetic organisms by recognizing, describing, and illustrating their characteristic morphological features. [Lecture; Bloom's 2-3]
5. Describe the major ecological roles and economic value, including food and industrial uses, of different plant groups. [Lecture; Bloom's 2]
6. Describe and differentiate various types of symbioses between plants and other organisms, including fungi, microbes, and animals. [Lecture; Bloom's 2-4]
7. Identify characteristic reproductive parts of different plant groups in illustrations provided, obtained using a dissecting microscope. [Lecture/lab; Bloom's 2]
8. Synthesize information on a plant or plant group or topic of their choice in writing, creating an essay that interprets and evaluates elements of the scientific literature to a general audience. [Essay component; Bloom's 3-6]

Schedule:

LECTURES:

Week	Dates	Subject Material
1	Sep 8	Intro to course materials: What are plants?
2	Sep 14/15	Prokaryotes and fungi as plant symbionts
3	Sep 21/22	Lichens [ONLINE]
4	Sep 28/29	Case studies in plant molecular systematics
5	Oct 5/6	"Algae" - a polyphyletic guild; Bryophytes - an evolutionary grade
6	Oct 10	[Thanksgiving on Monday]
6	Oct 12/13	Bryophytes (end); MIDTERM (in class Oct 13; up to bryophytes)
7	Oct 19/20	Seedless vascular plants; Gymnosperms
8	Oct 26/27	Gymnosperms (continued)
--	Nov 2/3	Fall Study Break – no labs or lectures
9	Nov 9/10	Introduction to the Angiosperms
10	Nov 16/17	Angiosperm diversity
11	Nov 23/24	More Angiosperm diversity
12	Nov 30/Dec 1	Ecology and case studies in plant conservation
13	Dec 7/8	Review/study break

Essay due Thursday Dec 1 by 5:00 pm through OWL

Exam Period (TBA): Final exam will emphasize material from the second half of the course.

LABS: (ALL LABS IN PERSON)

Week	Dates	Labs
1	Sep 8	NO LABS
2	Sep 14/15	Lab 1: Campus hike (Lab Assignment #1, 5%)
3	Sept 21/22	NO LABS
4	Sept 28/29	Lab 2: Classification exercise (Lab Assignment #2, 5%)
5	Oct 5/6	Lab 3: Molecular Phylogeny (Lab Assignment #3, 5%)
6	Oct 12/13	[Thanksgiving on Monday; Midterm Thursday] NO LABS
7	Oct 19/20	Lab 4: Bryophytes (Lab Assignment #4, 5%)
8	Oct 26/27	Lab 5: Ferns & Gymnosperms (Lab Assignment #5, 5%)
--	Nov 2/3	Fall Study Break – no labs or lectures
9	Nov 9/10	Lab 6: Flowering plants (Lab Assignment #6, 5%)
10	Nov 16/17	NO LABS (prepare for your essay)
11	Nov 23/24	Fun “Lab” (at home): Prepare a dish or meal for yourself or your family or friends, documenting the plant contributions to the dish(es). Submit to OWL between Nov 18 and Dec 8 for 2 bonus points
12	Nov 30/Dec 1	NO LABS (prepare for your essay)
13	Dec 7/8	NO LABS (Classes end Dec 8)

4. Course Materials

Required Text: [Gathering Moss](#), by Robin Wall Kimmerer. Copies available online and through the Campus Bookstore. We will make use of this book as we work through the course lectures. Exam questions (midterm and final) may be derived from this reading.

Helpful reference (NOT Required): Evert & Eichhorn, 2013, *Biology of Plants*, 8th edition, W.H. Freeman, New York. We will refer to Chapters 1 and 12-21, plus Chapter 32 (online). One copy will be on reserve in Taylor Science Library; used copies online from \$12 CAD. Also available to “[rent](#)”

Also useful: Simpson, M.G. 2019. *Plant Systematics*, 5th ed. Academic Press, Amsterdam [On reserve in Taylor Library]. This text has more than enough content for a full year graduate course.

Lab Manual: Provided weekly through OWL in or before lab.

Course Website: All course material will be posted to OWL: <http://owl.uwo.ca>. Any changes will be indicated on the OWL site and discussed with the class. If students need assistance, they can seek support on the OWL Help page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800. Google Chrome or Mozilla Firefox are the preferred browsers to optimally use OWL; update your browsers frequently. Students interested in evaluating their internet speed, please [click here](#). Students should check OWL on a regular basis for news and updates. This is the primary method by which information will be disseminated to all students in the class. The missing of critical information due to your failure to check OWL cannot be used as a basis for appeal.

5. Methods of Evaluation

Midterm Exam: 20%, 1 hour, IN PERSON in class, **Thursday Oct 13 at 1:30-2:20 pm**
[makeup midterm, with excused absence, on **Thursday October 20 at 6:00-7:00 pm**]

Lab Assignments 1-6: 5% each (for dates, see Course Calendar, above)

Essay: 20% Turn in **Thursday Dec 1 by 5:00 pm** through OWL

Final Exam: 30%, 2 hours in 3-hour time slot, IN PERSON, final exam period (TBA)

Note: This is a lab and essay course, so under Senate rules you must pass both the lab (30%) and essay (20%) components to pass the course.

6. Student Absences

If you are unable to meet a course requirement due to illness or other serious circumstances, please follow the procedures below.

Assessments worth less than 10% of the overall course grade (labs):

For work worth less than 10% of the total course grade (labs), provision of medical or other documentation to your Dean's Office Academic Counselling unit **is not required**. Contact your instructor directly via email (rgthorn@uwo.ca) to arrange for the weight of this assignment to be shifted to your remaining labs. However, **you must submit a minimum of 4 of 6 labs** to pass the lab component (and thus pass the course).

Assessments worth 10% or more of the overall course grade (midterm, essay, final exam):

By policy, academic considerations for work totalling 10% or more of the final course grade can be granted only by the student's Faculty of Registration (typically by their academic counsellors). In such cases, students should be directed as follows.

For work totalling 10% or more of the final course grade, you must provide valid medical or supporting documentation to the Academic Counselling Office of your Faculty of Registration as soon as possible. For further information, please consult the University's medical illness policy at

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf.

The Student Medical Certificate is available at

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf.

For your essay, an extension equivalent to the period excused by your faculty's Academic Counselling Office will be provided without grade penalty.

A makeup midterm, for those with Dean's excused absence, will be on **Thursday October 20 at 6:00-7:00 pm**.

Absences from Final Examinations

If you miss the Final Exam, please contact the Academic Counselling office of your Faculty of Registration as soon as you can. They will assess your eligibility to write the Special Examination (the name given by the University to a makeup Final Exam).

You may also be eligible to write the Special Exam if you are in a "Multiple Exam Situation" (e.g., more than 2 exams in 23-hour period, more than 3 exams in a 47-hour period).

If a student fails to write a scheduled Special Examination, the date of the next Special Examination (if granted due to excused absence) normally will be the scheduled date for the final exam the next time this course is offered (Fall 2024). The maximum course load for that term will be reduced by the credit of the course(s) for which the final examination has been deferred. See the Academic Calendar for details (under Special Examinations).

Note: missed work can *only* be excused through one of the mechanisms above. Being asked not to attend an in-person course requirement due to potential COVID-19 symptoms is **not** sufficient on its own.

7. Accommodation, Accessibility, and Academic Policies

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](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Accommodation_disabilities.pdf).

The website for Registrarial Services is <http://www.registrar.uwo.ca>

In accordance with policy,

https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf, the centrally administered e-mail account provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at their official university address is attended to in a timely manner.

Statement on Use of Electronic Devices: No electronic devices will be allowed during tests and examinations; ScanEX and remote proctoring will not be used in this course.

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

Plagiarism is a serious Scholastic Offence. Students must write their essays and assignments in their own words. Whenever students take an idea, or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence.

All essays 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>).

Grades:

Click [here](#) for a detailed and comprehensive set of policies and regulations concerning examinations and grading. The table below outlines the University-wide grade descriptors.

- A 90-100 One could scarcely expect better from a student at this level
- A 80-89 Superior work which is clearly above average*
- B 70-79 Good work, meeting all requirements, and eminently satisfactory
- C 60-69 Competent work, meeting requirements
- D 50-59 Fair work, minimally acceptable
- F below 50 Fail

*This implies a class average in the 70s.

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

To connect with a case manager or set up an appointment, please contact support@uwo.ca

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Accessible Education at

http://academicsupport.uwo.ca/accessible_education/index.html if you have any questions regarding accommodations.

Learning-skills counsellors at the Student Development Centre (<https://learning.uwo.ca>) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Western University is committed to a thriving campus as we deliver our courses in the mixed model of both virtual and face-to-face formats. We encourage you to check out the Digital Student Experience website to manage your academics and well-being:

<https://www.uwo.ca/se/digital/>

Additional student-run support services are offered by the USC, <https://westernusc.ca/services/>

EDI statement: For more information on Western's commitment to Equity, Diversity and Inclusion (EDI) please see <https://www.uwo.ca/equity/diversity/index.html>

Equity – We value equity of access and opportunity for members of underrepresented and equity-seeking groups.

Diversity – We value and respect the diversity of our campus community. We recognize the important contributions that diverse perspectives and lived experiences bring to Western’s teaching and learning environments.

Inclusion – We value inclusion and active engagement with and across diverse communities in all aspects of university life. We foster a welcoming campus community where everyone feels respected, valued and included.

The pronouns used by:

- The instructor, Greg Thorn, are: he/him/his
- TAs Makayla Lloyd, she/her/hers, and Julien Koga, he/him/his

Land acknowledgment

We acknowledge that Western University is located on the traditional lands of the Anishinaabek, Haudenosaunee, Lūnaapéewak and Chonnonton peoples, on lands connected with the London Township and Sombra Treaties of 1796 and the Dish with One Spoon Covenant Wampum. This land continues to be home to diverse Indigenous peoples (e.g. First Nations, Métis and Inuit) whom we recognize as contemporary stewards of the land and vital contributors of our society.

More information about Indigenous Services (<https://indigenous.uwo.ca/>) and this Land Acknowledgement (<https://communications.uwo.ca/comms/land-acknowledgement/>) are available.

Professionalism & Privacy:

Western students are expected to follow the Student Code of Conduct. Additionally, the following expectations and professional conduct apply to this course:

Students are expected to follow online etiquette expectations provided below

All course materials created by the instructor(s) are copyrighted and cannot be sold/shared

Recordings are not permitted (audio or video) without explicit permission

Permitted recordings are not to be distributed

Students will be expected to take an academic integrity pledge before some assessments. All recorded sessions will remain within the course site or unlisted if streamed

This course is supported by the Science Student Donation Fund. If you are a BSc or BMSc student registered in the Faculty of Science or Schulich School of Medicine and Dentistry, you pay the Science Student Donation Fee. This fee contributes to the Science Student Donation Fund, which is administered by the Science Students’ Council (SSC). One or more grants from the Fund have allowed for the purchase of equipment integral to teaching this course. You may opt out of the Fee by the end of September of each academic year by completing the online form linked from the Faculty of Science’s Academic Counselling site. For further information on the process of awarding grants from the Fund or how these grants have benefitted undergraduate education in this course, consult the chair of the department or email the Science Students’ Council at ssc@uwo.ca