DRAFT, SUBJECT TO CHANGE University of Guelph College of Biological Science Department of Integrative Biology

COURSE OUTLINE Plant Diversity and Evolution (BOT*3710) Winter 2019

Course Goal

This course will provide an introduction to the identification and interpretation of plant biodiversity. Students will explore the taxonomic diversity of flowering plants and investigate evolutionary hypotheses to explain variation in their reproductive, life history and growth characteristics. The principles and methods of evolutionary biology will form the underlying framework for the course. The course will be of value to students interested in biodiversity, the practical aspects of identifying plants, and understanding the variety of forms and life-styles observed among plants. (prerequisites: 7.5 credits including BIOL*1040 or 1070)

Teaching Team

<u>Professor:</u> TBA <u>Lab Instructor:</u> Carole Ann Lacroix, SSC 2507, botcal@uoguelph.ca, ext. 56444 Office hours: by appointment <u>Teaching Assistant:</u> TBA

Course Schedule

Lectures1:00–2:20 Tuesday & Thursday, CRSC 117 (note: some Thursday lecture periods
will be used as labs. Please check the schedule below)Labs2:30-5:20 Thursday, SSC 3315

Learning Outcomes

By the end of this course, students should be able to:

- 1) Recognize the major families of flowering plants in Ontario and their distinguishing morphological/ecological attributes.
- 2) Identify the major flowering plant families using taxonomic keys.
- 3) Identify select genera and species using taxonomic keys.
- 4) Interpret the evolutionary history of plants through an examination of phylogenetic trees.
- 5) Critically evaluate empirical evidence that tests hypotheses for the evolution of key vegetative, reproductive and genetic attributes of plants.
- 6) Interpret the patterns and causes of trait evolution in plants using phylogenetic information and comparative analytical software.

Course Resources

- Textbook:For lectures: There is no required text. Any assigned readings will be posted to
Courselink. For labs: Field Manual of the Michigan Flora, Voss E.G. & A.A. Reznicek,
Cranbrook Institute of Science is available in the UofG Bookstore and Coop
Bookstore.
- **Courselink:** This course will make use of the University of Guelph's course website on D2L (via Courselink). Consequently, you are responsible for all information posted on the Courselink page for BOT*3710. Please check it regularly.

Course Structure

The course is organized according to the philosophy that we learn best about biodiversity by: 1st, learning to recognize and identify different groups of plants; 2nd, observing character variation within and between these groups and; 3rd, interpreting this diversity by investigating the evolutionary causes of variation through comparative approaches. As a result, the course emphasizes classification and identification in the early stage and evolutionary interpretation in the latter stage.

Lecture periods

Lecture periods will be used for (1) team quizzes on the characteristics of the plant families that you are learning to identify in during lab periods and (2) team activities on how to use phylogenetic trees to test hypotheses about flowering plant evolution. Although class materials will be posted on Courselink, they are not a substitute for coming to lecture and participating in class activities.

Lab periods

Nine weeks of lab periods will focus on learning the characteristics and associated terminology of some of the most common, important, and interesting families of flowering plants. You will apply this knowledge to use professional taxonomic keys to identify vascular plants. Learning family characteristics, by allowing you to group related species together, makes it much easier to identify plants. The remaining lab periods will focus on designing and collecting data for a final group project using phylogenetic trees to test hypotheses about flowering plant evolution.

Note on teamwork: Throughout the semester, you will be working with a team of 4-6 other students to complete team quizzes during lecture periods, complete team assignments during lecture periods, and complete a final phylogenetic analysis project. We are incorporating teamwork into the class because one of the best ways to learn is to explain your thinking to others, and because on average teams produce higher-quality work than any one individual does. Further information on how teams will be assembled will be provided in class and via email.

Tentative Lecture and Lab Schedule (note that some Thursday lecture periods will be used for labs)

Week	Date	Lecture Topic (Tues,Thurs)	Lab Topic (Thurs)		
1	Jan 8	Introduction to class			
		Fill out team questionnaire			
1	Jan 10	No lecture; lab starts at 1 pm in the	Classification & Identification;		
		scheduled lab room	Morphology and use of keys:		
			Magnoliaceae, Ranunculaceae		
2	Jan 15	Write team contract			
		In-class team assignment #1:			
		Introduction to phylogenetic trees			
2	Jan 17	In-class team quiz on morphology,	Classification & Identification:		
		Magnoliaceae, and Ranunculaceae	Caryophyllaceae, Papaveraceae,		
		Lab starts at 1:45 pm in the	Brassicaceae		
		scheduled lab room			
3	Jan 22	In-class team assignment #2:			
		Interpretation of phylogenetic trees			
3	Jan 24	In-class team guiz on	Classification & Identification:		
		Caryophyllaceae, Papaveraceae, and	Fabaceae, Rosaceae, Apiaceae		
		Brassicaceae	(PLANT IDENTIFICATION-LAB QUIZ		
		Lab starts at 1:45 pm in the	#1)		
		scheduled lab room			
4	Jan 29	In-class team assignment #3: Using			
		phylogenetic trees to test			
		hypotheses, Example 1			
4	Jan 31	In-class team quiz on Fabaceae,	Classification & Identification:		
		Rosaceae, and Apiaceae	Euphorbiaceae, Boraginaceae,		
		Lab starts at 1:45 pm in the	Lamiaceae, Onagraceae		
-	E.L.E	scheduled lab room			
5	Feb 5	In-class team assignment #4: Using			
		phylogenetic trees to test			
_		hypotheses, Example 2			
5	Feb 7	In-class team quiz on Euphorbiaceae,	Classification & Identification:		
		Boraginaceae, Lamiaceae, and	Caprifoliaceae, Apocynaceae,		
		Onagraceae	Asteraceae (PLANT IDENTIFICATION-		
		Lab starts at 1:45 pm in the			
6	Eeb 12	In class team assignment #Fillsing			
	160 12	nhylogopotic troos to tost			
		hypothosos Example 2			
6	Feb 14	In-class team quiz on Caprifoliaceae	Classification & Identification		
		Anocynaceae and Asteraceae			
		Lah starts at 1.45 nm in the	maaccac, Linaccac, Juncaccac		
		scheduled lab room			
Winter	Feb 18 22	NOTECTURES	NOLAB		
Break					

Week	Date	Lecture Topic (Tues,Thurs)	Lab Topic (Thurs)
7	Feb 26	In-class team assignment #6: Using	
		phylogenetic trees to test	
		hypotheses, Example 4	
7	Feb 28	In-class team quiz on Iridaceae,	Classification & Identification:
		Liliaceae, and Juncaceae	Poaceae, Cyperaceae - Part 1
		Lab starts at 1:45 pm in the	(PLANT IDENTIFICATION-LAB QUIZ
		scheduled lab room	#3)
8	Mar 5	In-class team poster assignment	
8	Mar 7	In-class team quiz on Poaceae and	Classification & Identification:
		Cyperaceae	Poaceae, Cyperaceae - Part 2
		Lab starts at 1:45 pm in the	
		scheduled lab room	
9	Mar 12	In-class team assignment #7: Poster	
		presentation	
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9	Mar 14	No lecture; lab starts at 1pm in the	PLANT IDENTIFICATION – LAB
9	Mar 14	No lecture; lab starts at 1pm in the scheduled lab room	PLANT IDENTIFICATION – LAB
9	Mar 14 Mar 19	No lecture; lab starts at 1pm in the scheduled lab room Final phylogenetic analysis project:	PLANT IDENTIFICATION – LAB EXAM
9	Mar 14 Mar 19	No lecture; lab starts at 1pm in the scheduled lab room Final phylogenetic analysis project: Planning session	PLANT IDENTIFICATION – LAB EXAM
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Methods of Assessment

Assessment	Value	Date	Learning Outcome	Course activity
	(% of final grade)		(see above)	
Plant identification	Best 2 of 3	Jan 24	1, 2, 3	Lab, weeks 1-2
lab quizzes	2 x 6% = 12%	Feb 7	1, 2, 3	Lab, weeks 1-4
(individual grade)		Feb 28	1, 2, 3	Lab, weeks 1-7
Plant identification	30%	Mar 14	1, 2, 3	Lab, weeks 1-9
lab exam				
(individual grade)				
In-class team	Best 5 of 7	Jan 17	1,2,3	Lec, weeks 2-8
quizzes	5 x 1% = 5%	Jan 24		
(mean of individual		Jan 31		
and group grades)		Feb 7		
		Feb 14		
		Feb 28		
		Mar 7		
In-class team	7 x 3% = 21%	Jan 15	4, 5, 6	Lec, weeks 2-9
assignments		Jan 22		
(group grade)		Jan 29		
		Feb 5		
		Feb 12		
		Feb 26		
		Mar 5&12		
Poster on final	15%	Final	4, 5, 6	Lec, weeks 10-12
phylogenetic		version due		Lab, weeks 10-12
analysis project		Apr 5		
(group grade)		by 5:00 PM		
Peer feedback	2%	In lecture	4, 5, 6	Lec, week 12
drafts of on final		on April 2		
phylogenetic				
analysis poster				
(individual grade)				
Take-home final	15%	Due TBA	4, 5, 6	Lec, weeks 1-12
exam				Lab, weeks 10-12
(individual grade)				

Grades will be assigned according to the standards outlined in the U of G Undergraduate Calendar.

Description of Assessment

- *Plant identification lab quizzes and exam*: Your ability to identify plant specimens using a professional key will be assessed through three lab quizzes and a lab exam.
- *In-class team quizzes:* Research indicates that frequent, low-stakes quizzing improves performance by making you aware of what you do not know well in advance of the exam. Consequently, prior to seven of the plant ID labs, you will complete a quiz on plant morphology and family characteristics. You will first complete the quiz on your own, and then complete the same quiz with your team.

- *In-class team assignments*: In seven of the lecture periods, you will work with your team members on assignments. Six of these assignments are designed to help you learn about phylogenetic trees and how they can be used to test hypotheses about flowering plant evolution. One assignment is designed to help you learn how to do a poster presentation.
- Poster on final phylogenetic analysis project: During the last 3 weeks of labs and lectures, you will work with your team on a final phylogenetic analysis project. Your team will be expected to choose a question, identify a group of plants to use for the study, collect data from the literature, analyze the data using the methods learned through the in-class team assignments, and complete a poster describing the results.
- *Peer feedback on the final phylogenetic analysis poster:* In lecture on April 3rd, you will provide peer feedback on other teams' poster drafts.
- *Take-home final exam*: For the take-home final exam, you will complete a poster describing the results of the analyses from take-home assignment 3, 4, 5, or 6.

Important Dates

JAN 9 (Tues): First lecture in BOT*3710, 1:00 pm JAN 25 (Thurs): First lab quiz FEB 8 (Thurs): Second lab quiz FEB 19-23 (Mon – Fri): Winter break: NO CLASSES MAR 1 (Thurs): Third lab quiz MAR 15 (Thurs): Plant identification – lab exam MAR 9 (Fri): Course drop deadline (40th class day) APR 6 (Fri): Poster on final phylogenetic analysis project due (by 5:00 PM in Dropbox) APR 15 (Sun): Final take-home exam due (by 5:00 PM in Dropbox)

Course & University Policies

When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact, and be prepared to provide supporting documentation. See the Undergraduate Calendar for information on regulations and procedures for Academic Consideration

Policy for Re-grading of Exams and Assignments

Students who wish to have their exam or assignments re-graded must submit their exam or assignment within 1 week of the return of the exam or assignment. The entire exam or assignment will be re-graded so the mark may go up, down or remain unchanged.

Accessibility

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact the <u>Student Accessibility Services (SAS)</u> (formerly the Centre for Students with Disabilities) as soon as possible.

For more information, contact SAS at 519-824-4120 ext. 56208 or email <u>sas@uoguelph.ca</u>.

Academic Misconduct

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community – faculty, staff, and students – to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

The <u>Academic Misconduct Policy</u> is detailed in the Undergraduate Calendar.

E-mail Communication

As per university regulations, all students are required to check their <uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its students.

Drop Date

The last date to drop one-semester Winter 2018 courses, without academic penalty, is **Friday March 19**. For <u>regulations and procedures for Dropping Courses</u>, see the Undergraduate Calendar.

Copies of out-of-class assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

Recording of Materials

Presentations which are made in relation to course work—including lectures—cannot be recorded in any electronic media without the permission of the presenter, whether the instructor, a classmate or guest lecturer.

Grading

If you are absent from classes during the semester, you will be expected to make up missed lecture and laboratory material on your own. An assignment handed in late will be penalized 5% for every day that it is late.

General Campus Resources

If you are concerned about any aspect of your academic program:

Make an appointment with a <u>Program Counsellor</u> in your degree program.

If you are struggling to succeed academically:

There are numerous academic resources offered by the <u>Learning Commons</u> including, Supported Learning Groups for a variety of courses, workshops related to time management, taking multiple choice exams, and general study skills. You can also set up individualized appointments with a learning specialist.

If you are struggling with personal or health issues:

<u>Counselling services</u> offers individualized appointments to help students work through personal struggles that may be impacting their academic performance. <u>Student Health Services</u> is located on campus and is available to provide medical attention. For support related to stress and anxiety, besides Health Services and Counselling Services, <u>Kathy Somers</u> runs training workshops and one-on-one sessions related to stress management and high performance situations.

If you have a documented disability or think you may have a disability:

Student Accessibility Services (SAS) formerly Centre for Students with Disabilities (CSD) can provide services and support for students with a documented learning or physical disability. They can also provide information about how to be tested for a learning disability. For more information, including how to register with the centre please see visit the <u>SAS website</u>.

Additional Course Information

We expect you to

-take responsibility for your own learning

-prepare for and attend class and lab regularly

-participate enthusiastically in class activities and labs

-set high standards for your performance in the course

-treat others in the course respectfully

-turn in work on time

-stay informed about course information distributed online

-maintain academic integrity

You can expect us to

-help you become a better learner

-create interesting and challenging ways for you to learn about plant diversity and evolution

-set high standards for the class

-treat you with fairness and respect

-promptly respond to your questions and concerns about the course

-take an interest in your development as a botanist

-be excited and knowledgeable about the course material -grade and hand back your work promptly