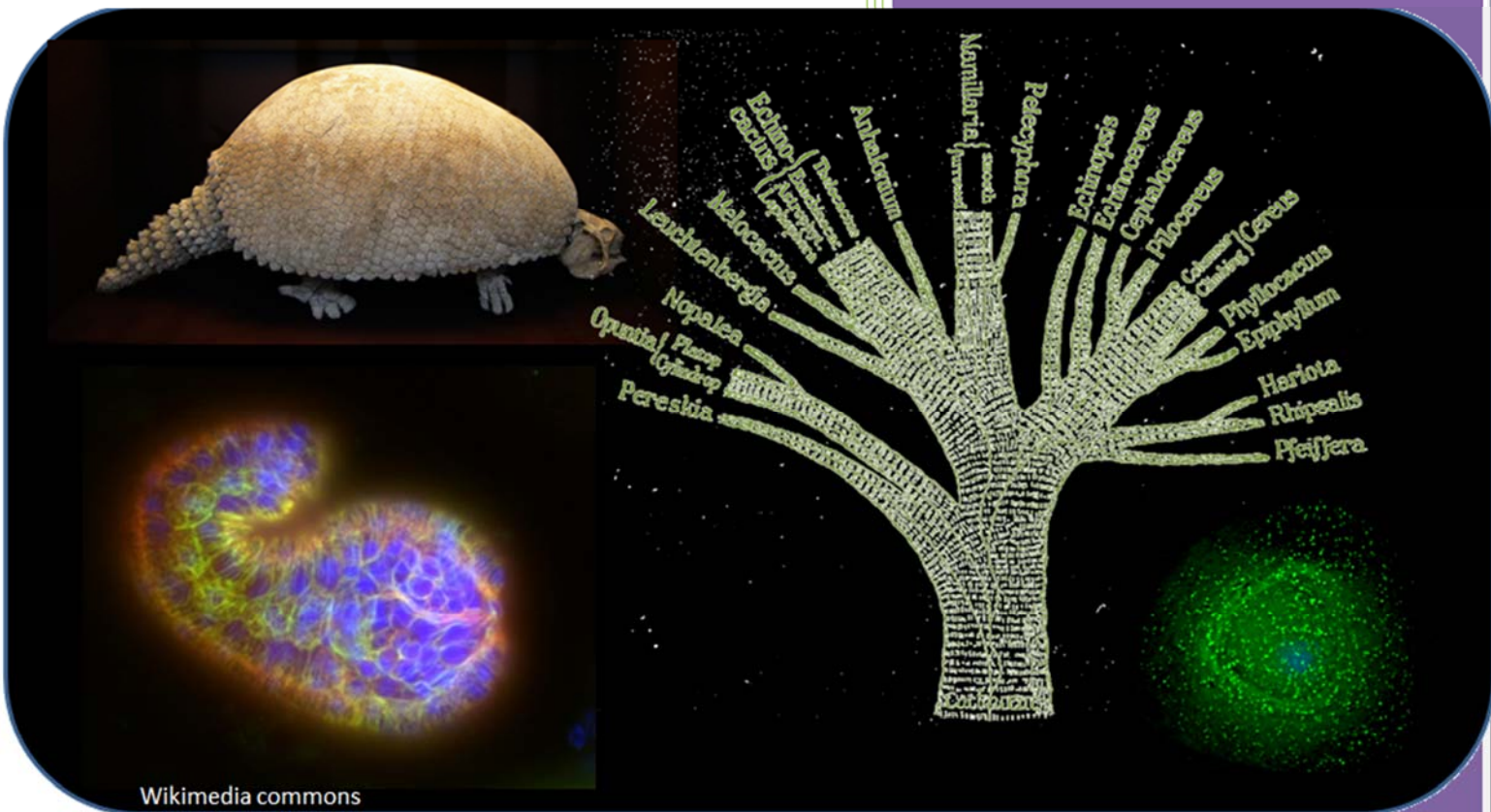


Winter 2019 Syllabus

BIO B51: Evolutionary Biology



Professor M. Andrade



Course Overview

Evolutionary Biology is the study of the diversity, relationships, and change over time in organisms at all scales of organization (from individuals to populations to higher taxonomic groups). The theory and principals of evolutionary biology give critical insight into a wide range of fields, including conservation, medicine, pathogenesis, community ecology, and development.

This lecture-based course will give you a firm grounding in modern Evolutionary Biology. Course material reinforces the logic and methods that underlie this field, illustrates these with key historical and modern research studies, and makes clear the importance of links to other areas of Life Sciences. This course assumes an introductory-level knowledge of Evolution.

Learning Outcomes

At the conclusion of this course, you will:

1. understand the basic principles of Evolutionary Biology, and be able to outline links between mechanisms of evolutionary change and patterns of diversity within as well as across species.
2. be able to suggest appropriate methodologies and approaches for testing predictions arising from hypotheses in different areas of Evolutionary Biology.
3. be able to explain how Evolutionary Biology links to other fields of Biology.

SUBJECT-SPECIFIC
KNOWLEDGE

4. be able to make logical inferences from a variety of different types of data, and evaluate how well or poorly a given dataset supports an argument or assertion
5. be able to identify, read and evaluate scientific research papers from the primary literature
6. understand how to motivate, support and engage in productive collaborative work in a professional context

GENERALIZABLE
COMPETENCIES

Course Personnel: Contact

Professor: Maydianne Andrade

biob51@utsc.utoronto.ca

Office hours:

Drop-in (AC254): Thursdays 1:30pm to 2:30pm

Online: Thursdays 2:30pm to 3:00pm

TA support:

BIOB51 TA's (marking & exam questions):

Monica Mowery

Catherine Scott

Nishant Singh

Integrative Poster Assignment TA: Jenya Daradur

bioposterhelp@utsc.utoronto.ca

Office hours: TBA

Course Coordinator: Jennifer Campbell

jacampbell@utsc.utoronto.ca

Office: SW421D

Office hours:

Monday 10:00 a.m. – 11:00 a.m.

Tuesday 2:00 p.m. – 3:00 p.m.

Wednesday 2:00 p.m. – 3:00 p.m.

Thursday 10:00 a.m. to 11:00 a.m.

Course Materials

All course information, the course schedule & syllabus is on the Quercus homepage.

Lectures: AC223

- **Tuesdays 10am – 11am** (WebOption post: Wednesdays)
- **Thursdays 10am – 11am** (WebOption post: Fridays)

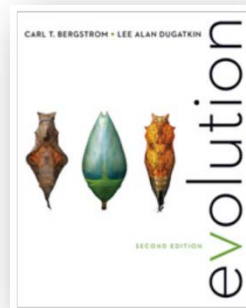
Tutorials: AC223

- **Thursdays 5pm – 7pm**
- **Dates: Jan 17, Jan 24, Feb 7, Mar 7, Mar 21, Mar 28, April 4**
you MUST attend these tutorials

Always consider the **GOLDEN RULE OF BIG CLASSES**:
 If *everyone* needs to know something, it will be on the course homepage! **Look there FIRST!**

Required text:

CT Bergstrom & LA Dugatkin Evolution 2nd edition. WW Norton. ISBN: 978-0-393-60103-9 (paperback); 978-0-393-61440-4 (ebook)



Readings in support of lecture material are on the course schedule. You should ensure that you **UNDERSTAND** everything you read, **KNOW** the theory and examples outlined in lecture and videos and ensure you can follow the additional examples given in the textbook.

Lecture slides will be posted on the course homepage as pdf files by the night prior to the lecture to allow you to fill in details or refer to figures/tables/references.

Taking your own notes is ESSENTIAL to success in this course.



All lectures will be available as online WebOption webcasts, linked to the Quercus homepage. The lectures are the intellectual property of Prof. Andrade, and are intended to be watched online only, to fill in notes, or as an aid for missed lectures. The lectures are posted 24 hours after the lecture is recorded. **WebOption lectures will be available for 2 weeks only, then removed.**

Note that BIOB51 personnel do not administer the WebOption webcasts, and do NOT have copies of the digital files of lectures. Any questions about the WebOption should be directed to the contacts listed on the WebOption homepage (<http://lecturecast.utoronto.ca/>).

I need help!
Who do I contact?



1. The Quercus homepage should be your **first stop for ALL questions.**

2. Course Content questions

e.g., "I need help with: lecture content, practice problems, video content, understanding the readings."

Ask Prof Andrade

- office hours
- discussion board
- course email (checked once per week: biob51@utsc.utoronto.ca)

3. Course Administration questions

e.g., I missed/will miss the term test, I have a medical note, I want to register an AccessAbility accommodation, I missed an assignment deadline

Ask the Course Coordinator:

Jennifer Campbell

jacampbell@utsc.utoronto.ca

I expect your attendance at lectures. WebOption should be used as a back-up only. Knowing the material AS PRESENTED IN LECTURES (NOT just the text on the slides) is MANDATORY for success in this course.

Tip for success in this course:

Come to lectures!

Being present in class allows you to ask questions as they arise, or otherwise signal to me the need for more explanation. You will keep up with the course material, know where you need help, and improve my ability to assist your learning.

Announcements: It is YOUR responsibility to be aware of announcements made in class. Major announcements will be posted on Quercus. Reminders are usually on the first slide presented in class.

Aids to Understanding: Quizzes & Practice problems

A. Examinable Videos & Quizzes.

Videos that complement and expand on the lecture material will be made available on the Quercus homepage (see links under the appropriate weekly 'Modules'). ***These contain examinable material.***

You will watch two types of examinable videos:

1. **Evolution! Documentaries.** (2). These are full-length films --'oldies but goodies'-- which are excellent reviews of some particular area of Evolutionary biology. The examples used are classics.
2. **Lock it in! Evolution-Shorts.** (2) These brief films expand on research in one particular system that is relevant to lecture material. These are intended to 'Lock in' your understanding of lecture material.



Quizzes. There will be a Quercus quiz associated with each of these videos, which will contribute to your final grade (see 'Evaluation') and highlight the examinable material from each video. Each quiz must be completed as outlined on the schedule, ***usually*** ~1 week after it is assigned (see schedule for specific dates). Answer keys will be posted after due dates and can be used as study guides for quiz material.

Tip for success in this course:

Take the practice problems seriously. DO ALL OF THEM. This is getting marks for studying!

B. Practice Problems

Three problem sets will be posted on Quercus during the term. Two of these must be submitted through Quercus and will contribute to your final grade (see 'Evaluation'). These problem sets are study tools that test your understanding prior to the term tests & the final exam. They are due by the date/time listed on the schedule, after which answers will be posted.

Quizzes and practice problem sets will be graded as pass/fail only.

A **pass (and full marks)** requires that you submit a **reasonable attempt** at answering **every question** (whether it is correct or not) by the due date/time. You may complete quizzes and practice problem sets in multiple sessions,

Quercus will save your answers as you go through the quiz. **Be sure to click 'Submit Quiz' only after you have finished all the questions.** Assignments are due by 11pm on the posted due date.

Quiz & Problem set Group Work/Collaborators: Working with others in a study group can be an effective way of exploring your understanding of material. If your preferred learning style involves discussing questions or a video with classmates, that is fine. Note the following mandatory rules for assignment collaboration: (1) you must declare the full names of your collaborators on the quiz or problem set (the last option on each assignment provides this opportunity); (2) while you may discuss questions/problems, **you MAY NOT write the answers collaboratively.** Written answers to questions and the actual calculations **must** be done independently. **Collaboratively written answers are a form of plagiarism, and a violation of the academic code (see below).**

Other Aids to Understanding

C. Ask Prof Andrade

Drop-in Office hours: Room: AC254; Thursdays 1:30pm to 2:30pm

Feel free to use my office hours as a study group. This is a great chance to get help, discuss the material, or just think about questions other students are asking. Course content questions may also be submitted to the discussion board.

Online Office hours: Thursdays 2:30pm to 3:00pm

Join online office hours using the '**Bb Collaborate**' link on the Quercus navigation bar.

Discussion Board: There are two discussion boards, one for student communication with each other (I will not comment on discussions on this board), and one which directs comments/questions to me (although students are also welcome to comment on threads on this board as well). As always, inclusive and civil discussion conforming to the Student code of conduct is expected. Disagreements and challenging opinions are welcome, but harrasment or disparagement of others is not acceptable and will be dealt with promptly.

Email: You may email questions to biob51@utsc.utoronto.ca. **Note that this email is checked once per week, and response time varies accordingly.** Faster responses are possible via Office hours, immediately after lecture, or via the Discussion Board. For course administration questions (e.g., I missed the midterm, I just joined the course) email Jennifer Campbell (jacampbell@utsc.utoronto.ca).

D. Textbook materials

Purchase of the textbook includes an e-book which is linked to the Quercus page. The e-book can also be purchased separately.

Study tools from the textbook that do not require textbook purchase are available on Quercus under 'Modules' < 'Textbook materials & enrichment'. These include chapter quizzes, flash cards, and animations. The use of these materials is optional.

Tip for success
in this course:

**Make time for
office hours or
post to the
discussion
board if you
need help!**

E. Supporting your mastery of academic English

The academic English used in science texts (and by Professors) tends to be concise with complex grammar that can make it challenging to interpret. Academic English is new to most students in University. If you want help mastering scientific texts, consider taking the free, 20-minute, confidential, **Academic English Health Check (AEHC)** ([sign up here](#)) and use the free support available at the [English Language Development Centre](#) to support your learning.

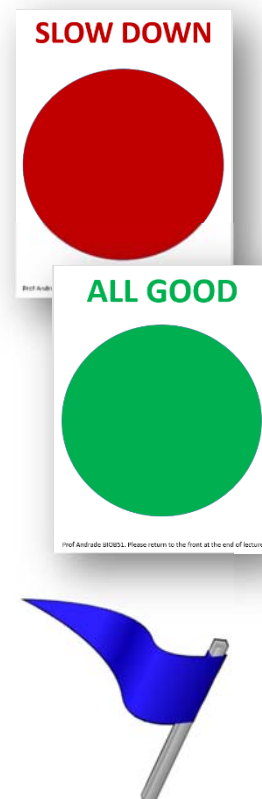
F. Lecture 'Speed Checks'.

I tend to speak relatively quickly, but students are often reluctant to ask me to slow down. To reduce the stress of real-time feedback, randomly chosen students will be asked to hold up Red or Green 'traffic light' when I request a 'lecture speed check'. Learn more about this in class. WebOption videos also provide the opportunity to replay unclear sections of lectures, and written answers to Discussion Board questions can be reviewed at your own pace.

G. Flagging disagreements

No textbook is perfect. I chose a book that has a good balance of well-presented content, good online learning tools, and a reasonable price. But in some cases, I disagree with the definitions or explanations provided by your textbook. I will make it clear where I disagree with the textbook, and you are responsible for the material as I teach it. This will be flagged in lecture, in notes posted in the e-book, and as a pdf printout of e-book notes that indicate relevant sections. As always, you are welcome to come to office hours to discuss/debate any of these points.

I require that you understand and learn my approach to course topics/definitions; this is what you should know for the term test and exam in this course.



Evaluation

Item	Value
Quizzes (4):	
<ul style="list-style-type: none"> 'Lock it in' Evo-shorts 1 & 2 Evolution! Documentaries 1 & 2 	1% (0.5% each) 4% (2.0% each)
Practice Problem sets 1 & 3 (Practice problem set 2 = not for marks)	4% (2% each)
Integrative Biology Poster Assignment	10%
Term test (Tentative date: Feb 16)	35%
Final exam (comprehensive)	46%

H. Integrative Biology Poster Assignment

In this assignment, you will develop your scientific communication skills by working with a group of peers (collaborators) to create an informative scientific poster which you will present to your peers, professors, and TA's in a poster session modelled on those held at most major scientific conferences. A major goal of this assignment is to recognize and highlight the links between different fields of study in the Biological Sciences. Your poster will explore a topic or question in biology for which insight can be gained by considering empirical research from at

least 2 different fields of study (represented by the three winter-term B-level core courses in the Department of Biological Sciences at UTSC). More information will be provided on the '**Integrative Research Poster Project – Winter 2019**' Quercus site and in tutorial sessions.

I. Term test & Final Exam:

Format. The **term test** will include two to three written-answer questions and 40 – 60 multiple choice and/or matching questions (specific break-down will be confirmed prior to the test). Topics covered are specified on the lecture schedule, and materials for which you are responsible include lecture material and online video content. The registrar will schedule the date for the test, likely in the week prior to or after reading week, after which the material covered will be confirmed. The term test will be ~1.5 – 2 hours in duration (to be confirmed prior to the test).

The **final exam** will consist of approximately 75– 95 multiple choice and/or matching questions (specific break-down will be confirmed prior to the exam), will be 3 hours in duration, and is scheduled by the registrar during the final exam period. The final is comprehensive. Roughly 2/3 of the final will be like a second term test on material not previously tested and 1/3 will be an inclusive exam with questions that span the entire course (see the course schedule for more details).

Content. The **term tests and final exam will focus on material covered in lecture, assigned videos, and material from the text to which I have specifically directed you during the lecture.** Questions will focus on your understanding of theory, hypothesis testing and mechanisms, evidence in support of these, as well as testing your ability to make inferences from novel examples or data. Straight recall of examples and vocabulary will also be required. The best way to study for these tests/exams is to (1) do the quizzes and practice problems, and be sure you understand the answers and (2) read and think about the examples in the text and in lectures--what do those examples demonstrate and why? To what area of theory do they apply? (3) test your understanding with the online chapter tests. (4) discuss, debate, and converse about course materials with your peers.

Tip for success in this course:

KNOW the lecture & video material & UNDERSTAND the readings.

Exam tip: concentrate on learning material presented in lectures & videos, know how predictions arise from theory, how data are used to test those predictions, and think about how to apply concepts to new data. Use your textbook readings to support these learning goals.

Details of textbook material will NOT be examinable unless I cover it in lecture, OR specifically direct you to it during lecture. However, I recommend that you do all the readings if you want to do well in this course.

Course Policies & Administration

AccessAbility

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel approach the AccessAbility Services as soon as possible. AccessAbility Services staff (located in Rm SW302, Science Wing) are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations (416-287-7560 or ability@utsc.utoronto.ca). The sooner you let them know your needs the quicker we can assist you in providing appropriate supports. Once AccessAbility identifies your needs, Jennifer Campbell should be notified.

If you need an accommodation, please ensure we are notified!

It is important to us that every student has the supports needed to achieve their learning goals in this course

Academic honesty & plagiarism

Academic integrity is one of the cornerstones of the University of Toronto. It is critically important both to maintain our community which honours the values of honesty, trust, respect, fairness and responsibility, and to protect you, the students within this community, and the value of the degree towards which you are all working.

According to Section B of the University of Toronto's [Code of Behaviour on Academic Matters](#), which all students are expected to know and respect, it is an offence:

- To use someone else's ideas or words in their own work without acknowledging that those ideas/words are not their own with a citation and quotation marks, i.e. to commit plagiarism;
- to use unauthorized study aids, such as test banks purchased online.

There are other offences covered under the Code, but these are by far the most common ones that apply in this course. I expect all students to respect these rules and the values which they protect.

Missed deadlines for quizzes and practice problem sets

Since answer keys are posted after the due date, extensions and make-ups for quizzes and practice problem sets are not possible. Failure to submit as specified, on time and complete, will result in a '0' for that component. The ONLY exceptions are for students who add the course after an assignment was due, or are registered with AccessAbility. If this is the case, you must contact Jennifer Campbell immediately after adding the course or recognizing the need for an accommodation.

Missed Term Test

Students who will be unable to attend the term test for religious reasons must notify the course coordinator (Jennifer Campbell) as soon as possible after the test date is posted. Students who are unable to attend the term test due to

- a short-term illness or severe personal circumstance must notify Jennifer Campbell by email within 3 working days and submit documentation
- an AccessAbility-related issue should inform that office and Jennifer Campbell to arrange an accommodation.

There will be a SINGLE make-up for the term test for students with a documented excuse or accommodation, confirmed as valid by Jennifer Campbell. Alternative arrangements are NOT possible, except as arranged by AccessAbility. The date of the make-up test will be announced on Quercus, and it is the SOLE RESPONSIBILITY of the affected student to ensure they know the date of the make-up test. Students who miss a term test with no acceptable, documented excuse will receive zero for that test. Students who miss a term test and the make-up and have documented, confirmed excuses for both will have their final scores adjusted so that the marks for the missed test are shifted to the final exam.

Students who **miss the final exam** must petition the Registrar to write a deferred exam



Tentative Schedule. See Quercus for updates

***Attendance at Poster tutorials is mandatory. Check the Poster schedule on Quercus for updates.**

Week	Date	Lecture #	Topic	Readings (Bergstrom/Dugatkin)	Available online	Due today
1	Tues Jan 8	1	Course introduction	Read the syllabus	Evo-short 1 online: Natural Selection & the Rock Pocket Mouse Quiz due Tues Jan 15, 11pm	
	Thurs Jan 10	2	<i>Recap: Natural Selection</i>	Chapter 1 (pp. 3 – 12); Chapter 2 (p. 42-48; 53 -55); Chapter 3 (pp. 65-79)		
2	Tues Jan 15	3	<i>Recap: Natural Selection & Evidence for Evolution</i>	Chapter 1 (p. 16-26);	Evo-short 2 online: Lizards in an evolutionary tree due Tues Jan 29, 11pm	DUE: Quiz for 'Evo-short 1' 'Save and submit' before 11pm
	Thurs Jan 17	4	<i>Recap: Evidence for Evolution & Evolutionary Analysis</i>	Chapter 3 (p. 80 – 84; p. 89 - 106); Chapter 19 (p. 677-680)		
		*Poster Tutorial 1 (5pm to 7pm): Introduction, Logistics & Expectations				
3	Tues Jan 22	5	Evolutionary Analysis: Experiment, Observation, Phylogeny & the Comparative method	Chapter 4 (p. 124-139); Chapter 5 (p. 176-181) <i>Animation: Reading Phylogenetic trees (Textbook materials, Chapter 4)</i>		
	Thurs Jan 24	6				
	Poster Tutorial 2 (5pm to 7pm): Group Dynamics, Group Meet & Greet					Personality test (bring printout)
	Friday Jan 25	Poster Project: Mini-deadline 1				Quiz: Scientific sources video
4	Tues Jan 29	7	Mutation & Variation	Chapter 3 (p. 69,70; p. 85 – 87)	Documentary 1 online Evolution: Great Transformations Quiz due Tues Feb 5, 11pm	DUE: Quiz for Evo-short 2 'Save and submit' before 11pm
	Thurs Jan 31	8		Chapter 6 (p. 195-210)		

Week	Date	Lecture #	Topic	Readings (Bergstrom/Dugatkin)	Available online	Due today
5	Tues Feb 5	9	Mechanisms of Evolution 1: Hardy-Weinberg, Mutation & Selection	Chapter 7 <i>Animation: Population Genetics (Textbook materials, Chap.7)</i>	Problem set 1 online Due Tues Feb 12	DUE: Qquiz for Documentary 1 'Save and submit' before 11pm
	Thurs Feb 7	10				
	Friday Feb. 8	<i>Poster Tutorial 3: Mandatory Group work session</i>				
	<i>Poster Project: Mini-deadline 2</i>				<i>Research Topic registration</i>	
6	Tues Feb 12	11	Mechanisms 2: Patterns of Selection	Chapter 7	Practice problem set 2 Online, Study tool: not for marks Documentary 2 online 'Evolutionary Arms Race' Quiz Due Thurs Mar 7	DUE: Problem set 1 'Save and submit' before 11pm
	Thurs Feb 14	12				
	BIOB51 Tutorial: Lecture Catch-up					
	Friday Feb 15	<i>Poster Project: Mini-deadline 3</i>				<i>Quiz: Poster Design Video</i>
Term test Date to be announced by registrar: Likely just before or after Reading week: Material covered will be announced once date is assigned						
Feb 18 - 22		Reading week				
7	Tues Feb 26	13	Mechanisms 3: Migration, Drift & Non-random mating	Chapter 8 (p.257-270; p.278 – 287) <i>Animation: Genetic Drift (Textbook materials, Chap.8)</i>		
	Thurs Feb 28	14	Mechanisms 4: Case Studies			
8	Tues Mar 5	15	The Arms Race: Viruses & Pathogens	References TBA		
	Thurs Mar 7	16				DUE: Quiz for Documentary 2 'Save and submit' before 11pm
	<i>Poster Tutorial 4: Mandatory Group Work Session</i>					
9	Tues Mar 12	17	Quantitative genetics: Continuous traits & Heritability	Chapter 9 (p. 309- 320; p. 345-357)		
	Thurs Mar 14	18				
	Thurs Mar 14	<i>Poster Project: mini-deadline 4</i>				<i>Draft poster due on Quercus & Turnitin</i>

Week	Date	Lecture #	Topic	Readings (Bergstrom/Dugatkin)	Available online	Due today
10	Tues Mar 19	19	Selection & speciation	Chapter 14 (p. 487-520)		
	Thurs Mar 21	20		--	Practice problem set 3 Online Due: Tues April 2	
	<i>Poster Tutorial 5: Peer review session</i>					
	<i>Poster Project: mini-deadline 5</i>					<i>Letter- sized version of poster</i>
11	Tues Mar 26	21	Darwin's Dilemma 1: Sexual selection	Chapter 16 (pp 587-603)		
	Thurs Mar 28	22				
	Poster Tutorial 6: Mandatory Group Work Session					
12	Tues April 2	23	Darwin's Dilemma 2: Social Behaviour & Altruism	Chapter 17 (607-622)		DUE: Practice Problem set 3 'Save and Submit' before 11pm
	Thurs April 4	24				
	Thurs April 4	The BIG DAY! Research Poster Session				
	Friday April 5					Due: Workload assessments
	April 6 - 9	Study Break				
Exam Period April 10 - 27	<p>FINAL EXAM (all material, including videos) Bring a non-programmable calculator. Date/time TBA by Registrar ~2/3 of exam: All material not covered in the term test ~1/3 of exam: cumulative, questions that integrate information across all course material</p>					