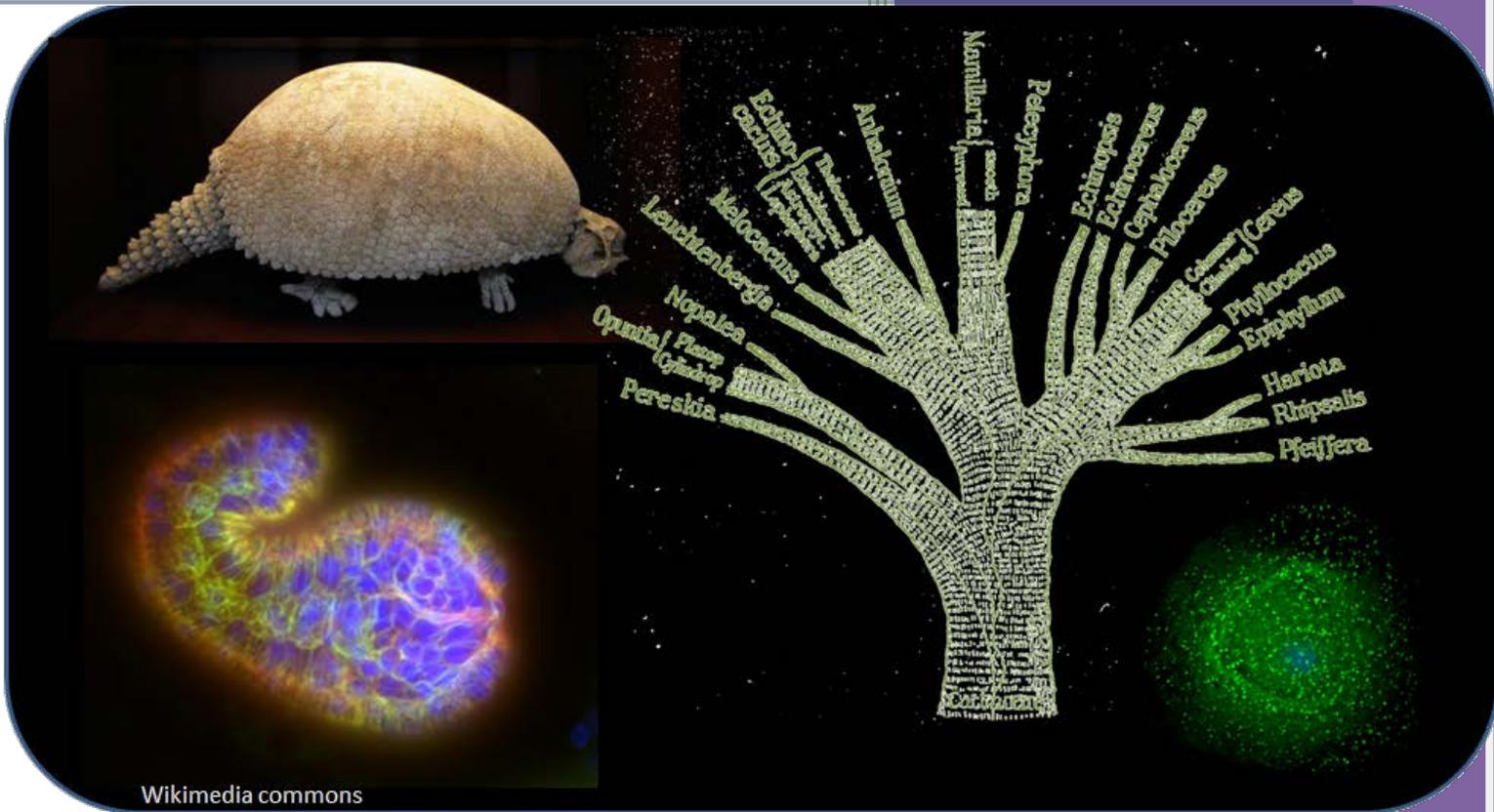


# 2015 Syllabus

## BIO B51: Evolutionary Biology



Prof. Maydianne Andrade



## Course Overview

*Evolutionary Biology is the study of the diversity, relationships, and change over time in organisms at all scales of organization (from 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 establishes 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.*

## Learning Objectives

In this course you will:

1. develop your understanding of the basic principles of Evolutionary Biology, including links between mechanisms of evolutionary change and patterns of diversity
2. learn a range of methodologies and approaches for testing predictions arising from hypotheses in different areas of Evolutionary Biology
3. gain an appreciation of how Evolutionary Biology links to all other fields of Biology
4. develop your ability to apply the logic of the scientific method
5. develop your ability to make inferences from data

SUBJECT-SPECIFIC  
KNOWLEDGE

GENERALIZABLE  
COMPETENCIES

## Course Personnel

**Professor:** Maydianne Andrade  
[maydianne.andrade@utoronto.ca](mailto:maydianne.andrade@utoronto.ca)  
Office: SW551

**TA:** Charmaine Condry (lecture TA & marking)  
[charmaine.condy@mail.utoronto.ca](mailto:charmaine.condy@mail.utoronto.ca)  
Office: SW551

**TA:** Luciana Baruffaldi (midterm marking only)  
[l.baruffaldi@mail.utoronto.ca](mailto:l.baruffaldi@mail.utoronto.ca)  
Office: SW551

**Course Coordinator:** Jennifer Campbell  
[jacampbell@utsc.utoronto.ca](mailto:jacampbell@utsc.utoronto.ca)  
Office: SW421D

## Course Materials

All course information & communication is via Blackboard.



Lectures: **AC223**

- Tuesdays 10am – 11am
- Thursdays 10am – 11am

Tutorials: **AC223**

- Thursday 5pm – 7pm
- 2 sessions will be used for midterms (see schedule); others TBA

Office hours

Prof Andrade: **AC254** (library study room)

- Thursdays 2pm -4pm

Charmaine Condy

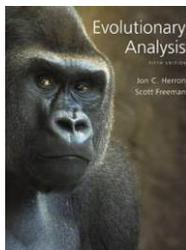
- prior to midterms only, date/times TBA

**Course homepage** is available on Blackboard, accessible via the University Portal ([portal.utoronto.ca](http://portal.utoronto.ca)) using your UTORid and password. Here you will find all course materials and information.

**Discussion board.** This is an excellent way to connect with your classmates, your TA, and me, and seek input on your understanding of class material. **Once per week, the lecture TA (Charmaine) and I will comment on discussions and outstanding questions.** As always, inclusive and civil discussion, conforming to the Academic code of conduct is the required standard. Disagreements are fine, personal attacks are not.

**Required text:** Herron, JC & Freeman, S. *Evolutionary Analysis* (5<sup>th</sup> Ed). 2013. Pearson/ Benjamin Cummings, ISBN-13: 978-0321616678

**Readings** in support of lecture material are outlined on the course schedule. You should ensure that you UNDERSTAND everything you read and can follow the examples given. ***I recommend you do the readings as this is the best way to ensure you understand the material.***



**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.***

***I need help!***  
***Who do I contact?***



**The Blackboard homepage should be your FIRST stop!**

Most information about the course is here...  
Including my blog and the discussion board with answers to common questions.

### 2. Course Content questions

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

**Ask Prof Andrade or Charmaine Condy**

...in office hours or via the discussion board (email is acceptable, but the least preferred [and slowest] means of contact)

### 3. Course Administration questions

e.g., I missed/will miss the midterm, medical notes, AccessAbility Accommodation, registration for the course marking scheme.

**Ask the Course Coordinator:**  
**Jennifer Campbell**

Feb 2015 schedule update



To facilitate note-taking, all lectures will be available as online WebOption webcasts, linked to the blackboard homepage. The lectures are the intellectual property of Prof. Andrade, and are intended to be watched online only. Downloading or saving them is not permitted.

Note that we do not administer the WebOption webcasts, and we 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.uts.utoronto.ca/>). All WebOption lectures will be available throughout the term.

**Attendance at lectures is optional.** However, it is **critical** that you understand the material **as presented in lectures** (NOT just the text on the slides), and only you can determine the best way to reach this goal. If you learn best in a live lecture, then be sure to attend the lectures in person! If you learn best at midnight while eating a bag of chips, then feel free to use the *WebOption* recordings to ensure your success.

If you choose to use WebOption exclusively, I suggest you **SCHEDULE** a time to watch the lectures each week  
**DO NOT PROCRASTINATE!**

**Announcements:** Even if you choose to watch the lectures online, it is YOUR responsibility to be aware of announcements made in class. These will be posted on Blackboard. **Be sure to CHECK the homepage and your University of Toronto email account each week to read the announcements.**

## Study aids & Quizzes

**Examinable videos & Quizzes.** Videos that complement the lecture material will be made available on the Blackboard homepage (see 'Content' link). These are examinable.

**There will be a blackboard quiz associated each of the 'lock it in' videos and with 2 of the 3 Documentaries. Quizzes must be completed within 1 week of the video being assigned.** An answer key for the quiz will be posted after quizzes are due. Quizzes are pass/fail only. A pass requires that you attempt a written answer for every question, whether it is correct or not, and submit the quiz by the due date. The quiz answer key is also an outline of the aspects of the video on which you should concentrate when studying for your midterms or final. A worksheet will be provided to guide your studying for the documentary for which there is no quiz.

You will watch two types of examinable videos:

1. **Evolution! Documentaries.** (3). These are full-length film '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 and emphasize why the example is important to Evolutionary Biology. These are intended to 'Lock in' your understanding of lecture material.



**Practice Problems:** 3 problem sets will be posted on Blackboard during the term. The first of these is a study aid for your first midterm, the other two must be submitted and will contribute to your final grade (see 'Evaluation'). Use all of these problem sets to test your understanding of concepts/equations prior to the midterms & final exam. Problem sets 2 and 3 will be scored as pass/fail. You will pass as long as you attempt to answer every question, regardless of whether you get the answer correct, and submit the completed problem set by the due date. Answers will be posted after the practice problems are due. Another source of useful practice questions/problems is the companion website associated with your textbook. See Blackboard link.

**Office hours** are on **Thursdays from 2pm to 4pm in a library study room (AC254)**. 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. The lecture TA (Charmaine) will have extra office hours just prior to the midterms (day/time TBA on blackboard).

Tip for success in this course:

**See me in office hours if you need help!**

## Evaluation

Item	Value
Quizzes: <ul style="list-style-type: none"> <li>• 'Lock it in' shorts (2)</li> <li>• Evolution! Documentaries (2)</li> </ul>	<ul style="list-style-type: none"> <li>• 1% (0.5% each)</li> <li>• 2% (1.0% each)</li> </ul>
Practice Problem sets (2)	2% (1% each)
Midterm test 1 (Tentative date: Feb 5)	25%
Midterm test 2 (Tentative date: Mar 5)	20%
Final exam	50%

### Midterms & Final Exam:

**Format.** The midterms will each include one written-answer question and approximately 40 – 50 multiple choice and/or matching questions (numbers will be confirmed prior to the exam). Topics covered in each midterm are specified on the schedule, and include lecture material and video content. Midterms will be 1.5 hours in duration.

The final exam will consist of approximately 70 – 80 multiple choice and/or matching questions, will be 3 hours in duration, and is scheduled by the registrar during the final exam period. The final is comprehensive and will cover material from the entire course, although material that has already been examined in the midterms will be covered in less detail. Roughly 2/3 of the final will be like a third midterm on material not previously tested and 1/3 will be an inclusive exam with questions that span the entire course.

**Content.** The midterms 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 as well as straight recall of examples—the best way to study for these types of questions is to read and think about the examples in the text, and to do the quizzes and practice problems.

For exams, concentrate on learning material presented in lectures & videos, know how data are used to test 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.** You should STILL do all the readings if you want to succeed in this course.

Tip for success in this course:

*KNOW the lecture & video material & UNDERSTAND the readings.*

## 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 free to 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 email [ability@utsc.utoronto.ca](mailto:ability@utsc.utoronto.ca). The sooner you let us know your needs the quicker we can assist you in achieving your learning goals in this course.

Once your needs are assessed, ensure you notify the Jennifer Campbell of the AccessAbility-determined accommodations that will ensure you are able to reach your academic goals in this course.

***Note that I always seek volunteer note-takers for this course, so it is not necessary to provide me with paper copies of the call for note-takers.***

### **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 so diligently.

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 for students:

- 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;

There are other offences covered under the Code, but this is by far the most common one that is likely to apply in this course. Please respect these rules and the values which they protect.

## Midterms

Students who will be unable to attend the midterm for religious reasons must notify the Course coordinator (Jennifer Campbell) as soon as possible after the date is announced. Students who are unable to attend the midterm due to illness must notify the course coordinator (Jennifer Campbell) within 3 working days of the test and arrange to present a completed UTSC medical certificate (available via the registrar's website) which confirms their illness, and medical attention, at the time of the exam. Students who contract a flu-like illness and are advised by University of Toronto policy (see [www.preparedness.utoronto.ca/pandemic.htm](http://www.preparedness.utoronto.ca/pandemic.htm)) to avoid attendance must still contact Jennifer Campbell to notify us of their illness. Medical certificates will be verified.

**There will be a single make-up for each midterm for students with a documented excuse, confirmed as valid by Jennifer Campbell. Alternative arrangements are not possible.** The date of the make-up exam will be announced on Blackboard, and it is the SOLE RESPONSIBILITY of the affected student to ensure they know the date of the make-up exam. Students who miss a midterm with no acceptable, documented excuse will receive zero for that midterm. Students who miss a midterm and the make-up and have documented, confirmed excuses for both will have their final scores adjusted to that the marks for the missed midterm is split between the other midterm and the final exam.

## Final Exam

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

## Quizzes and practice problem sets

These are due by 11pm on the posted due date via blackboard, failure to submit them by this time will result in a zero for that component. No make-ups are possible.

## Tentative Schedule. See Blackboard for updates

Date	Lecture #	Topic	Readings (Freeman & Herron, 5th ed)
Tues Jan 6	1	Course introduction	Chapter 3 (p. 73-97; optional: p. 97-104)
Thurs Jan 8	2	Intro to Darwinian Evolution	
Thurs Jan 8	<b>"Lock it in 1" online</b>	<b>Evo- short: Natural Selection &amp; Adaptation</b>	Quiz due Thurs Jan 15
Tues Jan 13	3	Evidence for Evolution 1	Chapter 2 (37-48 & 49-66)
Thurs Jan 15	4	Evidence for Evolution 2	
Thurs Jan 15	<b>Documentary 1 online</b>	<b>'Evolution: Great Transformations'</b>	Quiz due Thurs Jan 22
Thurs Jan 15	<b>Quiz DUE</b>	<b>QUIZ for 'Lock it in 1'</b>	
Tues Jan 20	5	Evolutionary Analysis 1: Experiment & Observation	Chapter 10 (p. 369-381)
Thurs Jan 22	6	Evolutionary Analysis 2: Phylogeny & Comparative method	Chapter 4 (p. 109-123), Chapter 10 (p. 382-387)
Thurs Jan 22	<b>Quiz DUE</b>	<b>QUIZ for Documentary 1</b>	
Thurs Jan 22	<b>"Lock it in 2" online</b>	<b>Evo-short: Lizards in an evolutionary tree</b>	Quiz due Thurs Jan 29
	<b>online</b>	<b>Practice problem set 1</b>	(not for marks, answer key provided)
Tues Jan 27	7	Evolutionary Analysis 2: Phylogeny & Comparative Meth B	Chapter 4 (p. 109-123), Chapter 10 (p. 382-387)
Thurs Jan 29	8	Mutation 1	Chapter 5 (p. 147-174)
Thurs Jan 29	<b>Quiz Due</b>	<b>QUIZ for 'Lock it in 2'</b>	
Tues Feb 3	9	Mutation 2	Chapter 6 (p. 169-216, p. 219-227)
Thurs Feb 5	10	Mechanisms of Evolution 1: HW, Mutation & Selection	
<b>Thurs Feb 5</b>		<b>TENTATIVE date: Midterm 1; 5pm – 7pm</b> All materials from Jan. 6 – Jan 27 (Lec 1 – 7; Documentary 1, <i>Lock it in 1</i> & 2)	
Tues Feb 10	11	Mechanisms 2: Patterns of Selection	Chapter 6 (p. 169-216, p. 219-227)
Thurs Feb 12	12		
	<b>Online</b>	<b>Practice problem set 2</b>	<b>Due Thurs Feb 26</b>
<b>Feb 16 - 20</b>	<b>Reading week</b>		
Tues Feb 24	13	Mechanisms 3: Migration & Drift	Chapter 7 (p. 233-239, 240-259, & 275-284)
Thurs Feb 26	14	Mechanisms 4: Drift & Non-random mating	
Thurs Feb 26	<b>DUE</b>	<b>Practice problem set 2</b>	
Tues Mar 3	15	Evolution & viruses: A case study of HIV	Chapter 1 (p. 1-30)

	<b>Documentary 2 online</b>	<b>'Evolution: The Eternal Arms Race'</b>	No quiz for this video; study worksheet provided online
<b>Date</b>	<b>Lecture #</b>		
Thurs Mar 5	16	Quantitative genetics 1: Heritability	Chapter 9 (p. 329-334; 343-347)
Thursday Mar 5	TENTATIVE Date: Midterm Exam 2. All material from Jan 29 to Feb 26 (Lec.8 - 14, Documentary 2) Bring a non-programmable calculator.		
Tues Mar 10	17	Misuse of heritability	Chapter 6 (p. 214-216); Chapter 9 (p. 360-364)
Thurs Mar 12	18	Quantitative genetics 2: Response to selection	Chapter 9 (p. 348-353)
Thurs Mar 12	<b>Online</b>	<b>Practice problem set 3</b>	<b>Due Tues Mar 24</b>
Tues Mar 17	19	Modes of Selection & speciation 1	Chapter 9 (p. 356-360); Chapter 16 (p. 616-641)
Thurs Mar 19	20	Speciation 2	
Tues Mar 24	21	Sexual selection 1	Chapter 11 (p. 407-427)
Tues Mar 24	<b>Documentary 3 online</b>	<b>'Evolution: Extinction!'</b>	<b>Quiz due Thurs April 2</b>
Tues Mar 24	<b>DUE</b>	<b>Practice problem set 3</b>	
Thurs Mar 26	22	Sexual selection 2	Chapter 11 (p. 428-440)
Tues Mar 31	23	Life history & Evolution of Aging	Chapter 13 (p. 491-512)
Thurs Apr 2	24	Lecture Catch-up	
	<b>Quiz Due</b>	<b>Quiz for Documentary 3</b>	
<b>April 5-9</b>	<b>Study Break</b>		
Exam Period April 10-26	<p>FINAL EXAM (all material, including videos) Bring a non-programmable calculator. Date/time TBA by Registrar</p> <ul style="list-style-type: none"> <li>• ~2/3 of exam: Jan. March 3 – April 2 (Lec. 15 – 24, Documentary 3)</li> <li>• ~1/3 of exam: cumulative, all course material</li> </ul>		