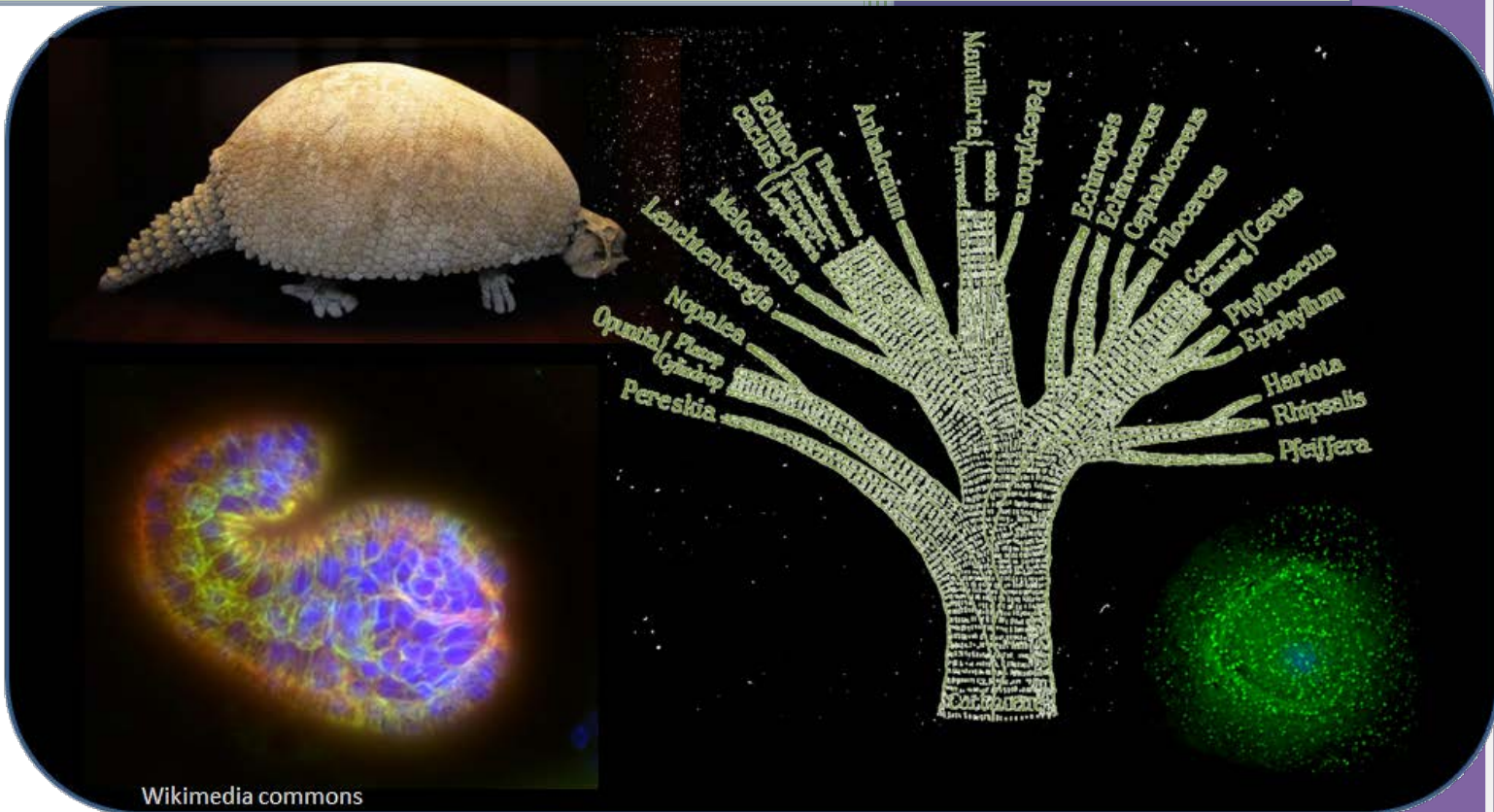


# 2016 Syllabus

## 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 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 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 within as well as across species.
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 to any problem
5. develop your ability to make inferences from data
6. develop your ability to evaluate support for arguments or assertions

SUBJECT-SPECIFIC  
KNOWLEDGE

GENERALIZABLE  
COMPETENCIES

## Course Personnel: Contact

**Professor:** Maydianne Andrade

[biob51@utsc.utoronto.ca](mailto:biob51@utsc.utoronto.ca)

**Office hours** held in **AC254** (library study room)

- Wednesdays 1pm -2pm
- Fridays 3pm – 4:30pm

**Course Coordinator:** Jennifer Campbell

[jacampbell@utsc.utoronto.ca](mailto:jacampbell@utsc.utoronto.ca)

Office: SW421D

**Office hours:**

Mondays – Fridays 9am to noon

Or by appointment

### TA's (exam marking only)

Luciana Baruffaldi

Sheena Fry

Monica Mowery

Juan Sebastian Vargas Soto

## Course Materials

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



Lectures: AC223 or via WebOption

- Tuesdays 10am – 11am, posted on WebOption: Wednesdays
- Thursdays 10am – 11am, posed on WebOption: Fridays

Tutorials: AC223

- Thursday 5pm – 7pm
- 2 sessions will be used for term tests (see schedule)

Office hours

Prof Andrade: AC254 (library study room)

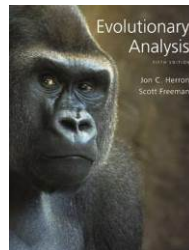
- Wednesdays 1pm -2pm
- Fridays 3pm – 4:30pm

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:** 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 on the course schedule. You should ensure that you UNDERSTAND everything you read, KNOW the examples given in lecture 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 blackboard homepage. The lectures are the intellectual property of Prof. Andrade, and are intended to be watched online only. The lectures are posted 24 hours after the lecture is recorded. **WebOption lectures will be available throughout the term; they will not be removed until after the final exam.**

*I need help!*

*Who do I contact?*



**1. The Blackboard 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
- email ([biob51@utsc.utoronto.ca](mailto: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

**Ask the Course Coordinator:  
Jennifer Campbell**

Office hours (or by appointment)  
Email: [jacampbell@utsc.utoronto.ca](mailto:jacampbell@utsc.utoronto.ca)

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.uts.utoronto.ca/>).

***Attendance at lectures is optional, but knowing the material AS PRESENTED IN LECTURES (NOT just the text on the slides) is MANDATORY for success in this course.***

This can be done through in-person attendance OR watching lectures online. Students registered in Lec01 are registered for the 'live' lecture, and students registered in Lec60 are registered for WebOption. However, only **you** can determine the best way for you to succeed. If you learn best at midnight while eating a bag of chips, then even if you are registered in Lec 01, you should feel free to use the *WebOption* recordings to ensure your success.

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

**Announcements:** It is YOUR responsibility to be aware of announcements made in class in a timely way. These will be posted on Blackboard as well as on the first slide presented in class. **Be sure to CHECK the homepage AND your University of Toronto email account each week to read the announcements.**

## **Aids to Understanding: Quizzes & Practice problems**

### **A. Examinable videos & Quizzes.**

Videos that complement the lecture material will be made available on the Blackboard homepage (see 'Content' link). ***These contain examinable material.***

You will watch two types of examinable videos:

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



**Quizzes.** There will be a blackboard 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 within 1 week of the video being assigned (as outlined on the schedule). An answer key for each quiz will be posted after it is due and can be used as a study guide for the video materials.

### **B. Practice Problems**

Three problem sets will be posted on Blackboard during the term. Two of these must be submitted through blackboard 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. Answers will be posted after the practice problems are due. I recommend you do them all!

**Quiz & Problem set marking: Quizzes and practice problem sets will be graded as pass/fail only.**

A **pass (and full marks)** requires that you submit your assignment with a **reasonable attempt** at answering **every question** (whether it is correct or not), and that you submit the complete set of answers by the due date/time (click 'save and submit' on blackboard).

You may complete quizzes and practice problem sets in multiple sessions. If you do this, be sure to save your answers after each session ('save answer' as you complete each one and/or 'save all answers' when you are finished with a work session). When you are done, you must click 'save and submit' and then 'ok' to confirm your submission. The university has Blackboard test-taking tips [here](#). Assignments are due by 11pm on the posted due date.

**Failure to submit a completed assignment by 11pm on the due date will result in a zero for that component. NO EXTENSIONS will be granted. Do NOT leave it until the last minute to 'submit'.**

## Other Aids to Understanding

### A. Prof Andrade's Office hours (drop-in, AC254).

- Wednesdays 1-2pm
- Fridays 3pm -4:30pm

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. My schedule is very full, so these are the only times available for in-person consultation. However, questions may also be submitted by email ([biob51@utsc.utoronto.ca](mailto:biob51@utsc.utoronto.ca)) or via the discussion board (see below). Online real-time discussion is also a possibility if there is sufficient interest.

### B. Discussion board (Blackboard).

This is an excellent way to connect with your classmate and me, seek input on your understanding of class material, or consider connections between material brought up in class and current events or material in other classes. **I will comment on discussions and outstanding questions once per week.** As always, inclusive and civil discussion conforming to the Academic code of conduct is expected. Disagreements are fine, personal attacks are not.

Tip for success in this course:

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

### C. Textbook companion website

Located at [www.pearsonhighered.com/herron](http://www.pearsonhighered.com/herron), the companion website for the textbook does NOT require a login (i.e., you can use the materials there regardless of whether you have purchased the text). Study tools include activities & simulations that can help you explore your understanding, extra study questions for most chapters, and answers to the end-of-chapter questions in the textbook.

Tip for success in this course:

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

## Evaluation

Item	Value
Quizzes (5): 'Lock it in' Evo-shorts 1 &2 Evolution! Documentaries 1-3	1% (0.5% each) 3% (1.0% each)
Practice Problem sets 2 & 3 (Practice problem set 1 = not for marks)	2% (1.0% each)
Term test 1 (Tentative date: Feb 4)	24%
Term test 2 (Tentative date: Mar 3)	20%
Final exam (comprehensive)	50%

### Term tests & Final Exam:

**Format.** The term tests will each include one or two written-answer questions and 40 – 60 multiple choice and/or matching questions (specific break-down will be confirmed prior to each test). Topics covered in each term test are specified on the lecture schedule, and materials for which you are responsible include lecture material and online video content. Term tests will be ~1.5 hours in duration (will 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 and will cover material from the entire course, although material that has already been examined in the term tests will be covered in less detail. Roughly 2/3 of the final will be like a third 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 and mechanisms, and evidence in support of these, as well as straight recall of examples and vocabulary—the best way to study for these types of questions 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 companion website-- what do those examples demonstrate and why? To what area of theory do they apply?

For exams, **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 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.

### 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:

- 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;

Note that it is also an offence to use unauthorized study aids, such as test banks purchased online.

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

### Missed Term Tests

Students who will be unable to attend a term test for religious reasons must notify the Course coordinator (Jennifer Campbell) as soon as possible. Students who are unable to attend a term test 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 should avoid attendance but 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 term test 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 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 to that the marks for the missed test is split between the other test and the final exam.

### Missed Final Exam

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

### Missed deadlines for quizzes and practice problem sets

There will be NO EXTENSIONS and NO MAKE-UPS for quizzes and practice problems. Failure to submit as specified, on time and complete, will result in a '0' for that component.



## Tentative Schedule. See Blackboard for updates

Date	Lecture #	Topic	Readings (Freeman & Herron, 5th ed)
Tues Jan 5	1	Course introduction	Chapter 3 (p. 73-97; optional: p. 97-104)
Thurs Jan 7	2	Darwinian Evolution	
	<b>Evo-short 1 online</b>	<b>ES.1. Natural Selection &amp; the Rock Pocket Mouse</b>	<i>Blackboard: Course materials &gt; Evo-Shorts Quiz due Thurs Jan 14, 11pm</i>
Tues Jan 12	3	Recap: Evidence for Evolution	Chapter 2 (37-66)
Thurs Jan 14	4	Evolutionary Analysis 1: Experiment & Observation	Chapter 10 (p. 369-381)
	<b>Quiz DUE</b>	<b>QUIZ for 'Evo-short 1'</b>	<b>Click 'save and submit' before 11pm</b>
	<b>Tutorial 1</b>	<i>NO Tutorial</i>	
	<b>Documentary 1 online</b>	<b>Doc 1. 'Evolution: Great Transformations'</b>	<i>Blackboard: Course materials &gt; Documentaries Quiz due Thurs Jan 21, 11pm</i>
Tues Jan 19	5	Analysis 1 (continued), Analysis 2: Phylogeny & Comparative method	Chapter 3 (p. 382-387); Chapter 4 (p. 109-123; 137-139)
Thurs Jan 21	6		
	<b>Quiz DUE</b>	<b>QUIZ for Documentary 1</b>	<b>Click 'save and submit' before 11pm</b>
	<b>Evo-short 2 online</b>	<b>ES.2. Lizards in an evolutionary tree</b>	<i>Blackboard: Course materials &gt; Evo-Shorts Quiz due Thurs Jan 28, 11pm</i>
	<b>Online</b>	<b>Practice problem set 1</b>	(not for marks, answer key provided)
Tues Jan 26	7	Mutation & Variation	Chapter 10 (p.387-389); Chapter 5 (p. 147-174)
Thurs Jan 28	8		
	<b>Quiz Due</b>	<b>QUIZ for 'Evo-short 2'</b>	<b>Click 'save and submit' before 11pm</b>
	<b>Online</b>	<b>Practice problem set 1, answers available</b>	
Tues Feb 2	9	Mechanisms of Evolution 1: Hardy-Weinberg, Mutation & Selection	Chapter 6 (p. 179-227)
Thurs Feb 4	10		
<b>Thurs Feb 4</b>	<b>TENTATIVE date: Term Test 1. 5pm – 7pm</b> <b>All materials from Jan. 7 – Jan 28 (Lec 1 – 8; Documentary 1, Evo-Shorts 1 &amp; 2)</b>		
Tues Feb 9	11	Mechanisms 2: Patterns of Selection	Chapter 7 (p. 233-259, & 275-283)
Thurs Feb 11	12	Mechanisms 3: Migration, Drift & Non-random mating	
Friday Feb 12	<b>Online</b>	<b>Practice problem set 2</b>	<b>Due Thurs Feb 25, 11pm</b>
<b>Feb 15 - 20</b>	<b>Reading week</b>		
Tues Feb 23	13	Mechanisms 4: Case Studies	Chapter 7 (p. 283-284)
Thurs Feb 25	14	Lecture Catch-up	
	<b>DUE</b>	<b>Practice problem set 2</b>	<b>Click 'Save and submit' before 11pm</b>



Date	Lecture #	Topic	Readings (Freeman & Herron, 5th ed)
Tues Mar 1	15	Evolution & viruses: Case study of HIV	Chapter 1 (p. 1-30); Chapter 10 (p. 397-401)
Thurs Mar 3	16		
<b>Thursday Mar 3</b>	<b>TENTATIVE Date: Term Test 2. 5pm – 7pm</b>		
<b>All material from Feb 2 to Feb 25 (Lec. 9 - 14). Bring a non-programmable calculator.</b>			
Tues Mar 8	17	Quantitative genetics 1: Continuous traits & Heritability	Chapter 9 (p. 329-334; 343-347)
	<b>Documentary 2 online</b>	<b>Doc 2. 'Evolution: The Eternal Arms Race'</b>	<b>Quiz due Tues Mar 15</b>
Thurs Mar 10	18	Misuse of heritability: IQ & 'Race'	Chapter 6 (p. 214-216); Chapter 9 (p. 360-364)
	<b>Online</b>	<b>Practice problem set 3</b>	<b>Due Tues Mar 22</b>
Tues Mar 15	19	Quantitative genetics 2: Response to selection	Chapter 9 (p. 348-356)
	<b>DUE</b>	<b>Quiz for Documentary 2</b>	<b>Click 'Save and Submit' before 11pm</b>
Thurs Mar 17	20	Lecture catch-up	
Tues Mar 22	<b>Documentary 3 online</b>	<b>Doc 3. 'Evolution: Why Sex?'</b>	<b>Quiz due Thurs Mar 31</b>
	<b>DUE</b>	<b>Practice problem set 3</b>	
	21	Sex & Darwin's Dilemma (Sexual selection)	Chapter 8 (p. 314-324); Chapter 11 (p. 407-437)
Thurs Mar 24	22		
Thurs Mar 24	Tutorial 5pm – 6pm	Review session: email questions to <a href="mailto:biob51@utsc.utoronto.ca">biob51@utsc.utoronto.ca</a> by Tuesday 22.	
Tues Mar 29	23	Evolution of Life history & Aging	Chapter 13 (p. 491 – 510); Chapter 10 (p. 389-391)
Thurs Mar 31	24		
	<b>DUE</b>	<b>Quiz for Documentary 3</b>	<b>Click 'Save and Submit' before 11pm</b>
<b>April 5-7</b>	<b>Study Break</b>		
<b>Exam Period April 8-22</b>	<b>FINAL EXAM (all material, including videos)</b> <b>Bring a non-programmable calculator. Date/time TBA by Registrar</b> <ul style="list-style-type: none"> <li>• ~2/3 of exam: March 1 – March 31 (Lec. 15 – 24, Documentaries 2 &amp; 3)</li> <li>• ~1/3 of exam: cumulative, all course material</li> </ul>		