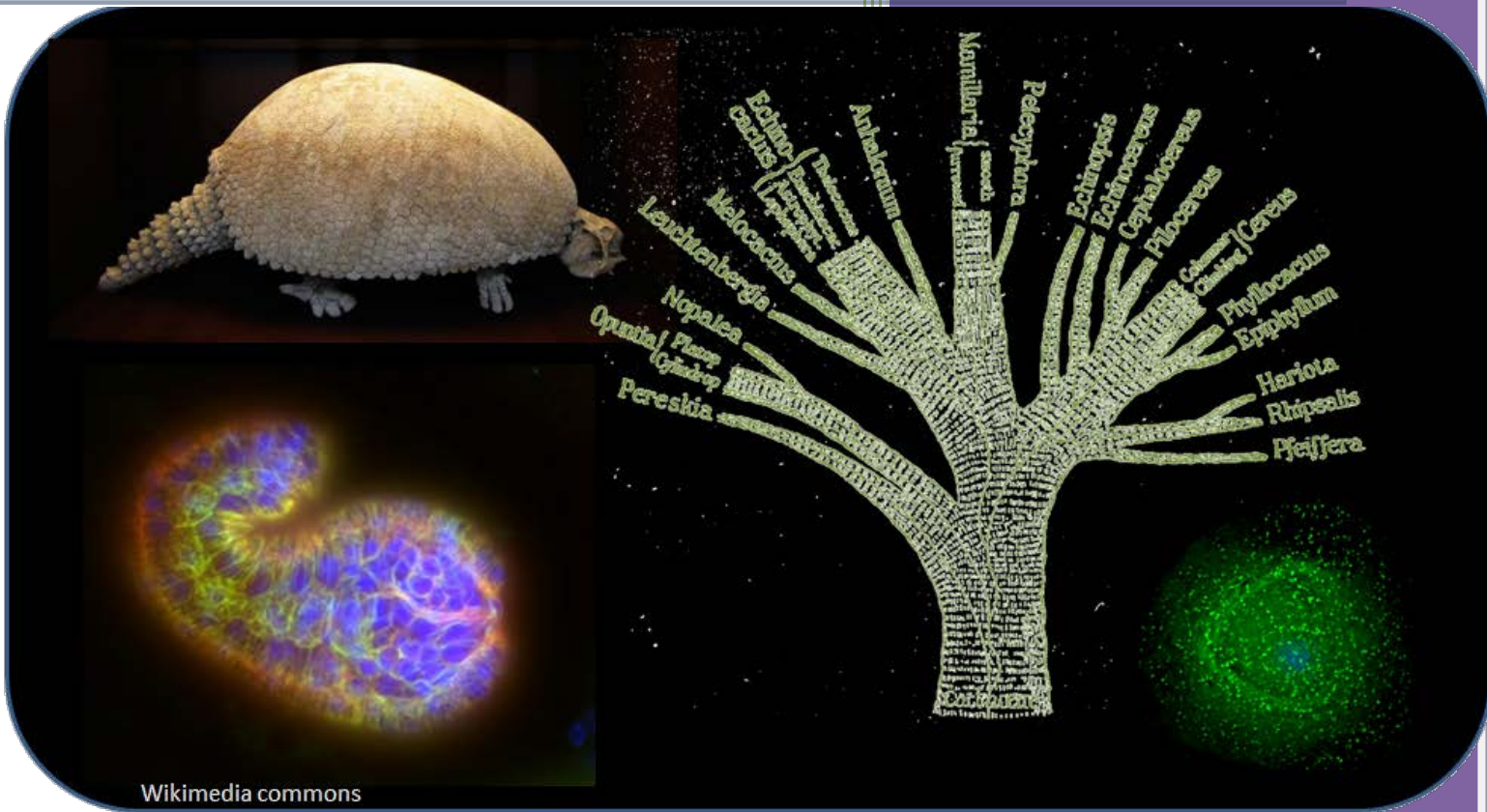


2017 Syllabus

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 Outcomes

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. increase your understanding 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

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

- Wednesdays 9:30am-10:30am
- Fridays 3pm – 4:00pm

Course Coordinator: Irene Wandili
irene.wandili@utoronto.ca

Office: SW421D

Office hours:

Mondays, Tuesdays and Wednesdays,
10am – noon

TA's (exam marking only)

Ashley Bramwell
Monica Mowery
Nishant Singh

Course Materials

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



Lectures: AC223

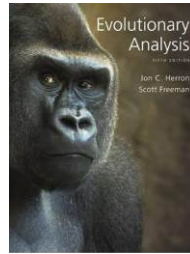
- **Tuesdays 10am – 11am**, posted on WebOption: Wednesdays
- **Thursdays 10am – 11am**, posted on WebOption: Fridays

Tutorials: AC223

- **Thursday 5pm – 7pm (Jan 12, Feb 2, Feb 16*, Mar 9)**
*attendance mandatory: tentative midterm date

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 (5th 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 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 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.**

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 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)

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:

Irene Wandili

Office hours: Mondays, Tuesdays and Wednesdays, 10am – noon

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. Only **you** can determine the best way for you to succeed. 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 are more likely to keep on top of the material if you are in class, then make it a priority to be present at lectures.

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. Major announcements will be posted on Blackboard, and reminders will be 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 and expand on 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 as outlined on the schedule, ***usually*** ~1 week after it is assigned (see schedule for specific dates). 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 ONLY when you are ready to submit). 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.

Group Work/Collaborators: Working with others in a study group can be an effective way of exploring your understanding of material. For these assignments and practice problems, if your preferred learning style involves working your way through questions or discussing a video with classmates, that is fine. Note the following mandatory rules however: (1) you must declare the full names of your collaborators on the assignment (the last option on each assignment provides this opportunity); (2) while you may discuss questions/problems, **you MAY NOT write the answers collaboratively**. Answer 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

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

- Wednesdays 9:30-10:30am
- Fridays 3pm -4:00pm

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 or by email (biob51@utsc.utoronto.ca).

Tip for success in this course:

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

B. Discussion board

This is an excellent way to connect with your classmates 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.

C. Textbook companion website

Located at www.pearsonhighered.com/herron, the companion website for the textbook does NOT require a login or textbook purchase. 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.

Evaluation

Item	Value
Quizzes (5):	
<ul style="list-style-type: none"> • 'Lock it in' Evo-shorts 1 & 2 • Evolution! Documentaries 1-3 	1% (0.5% each) 3% (1.0% each)
Practice Problem sets 1 & 3 (Practice problem set 2 = not for marks)	4% (2% each)
Term test (Tentative date: Feb 16)	36%
Final exam (comprehensive)	56%

Term tests & Final Exam:

Format. The term tests will each include one 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 term 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 1/2 of the final will be like a second term test on material not previously tested and 1/2 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, 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?

Tip for success in this course:

KNOW the lecture & video material & UNDERSTAND the readings.

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. 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 Irene Wandili 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 deadlines for quizzes and practice problem sets

There will be NO EXTENSIONS and NO MAKE-UPS for quizzes or practice problems. Failure to submit as specified, on time and complete, will result in a '0' for that component. The ONLY exception is for students who added the course after an assignment was due. If this is the case, you must contact Irene Wandili IMMEDIATELY after adding the course to arrange an adjustment in your marking scheme.

Missed Term Tests

Students who will be unable to attend a term test for religious reasons must notify the course coordinator (Irene Wandili) as soon as possible after the conflict is recognized. Students who are unable to attend a term test due to illness must notify Irene Wandili 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 Irene Wandili to notify us of their illness. Medical certificates will be verified.

There will be a SINGLE make-up for the term test for students with a documented excuse, confirmed as valid by Irene Wandili. Alternative arrangements are NOT possible. The date of the make-up test 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 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 to that the marks for the missed test is shifted to the final exam.

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



Tentative Schedule. See Blackboard for updates

Date	Lecture #	Topic	Readings (Freeman & Herron, 5th ed)
Tues Jan 3	1	Course introduction	Read the syllabus
	Evo-short 1 online	Natural Selection & the Rock Pocket Mouse	Blackboard: Course materials > Evo-Short1 Quiz →due Thurs Jan 12, 11pm
Thurs Jan 5	2	Recap: Natural Selection	Chapter 3 (p. 73-97; optional: p. 97-104)
Tuesday Jan 10	3	Recap: Evidence for Evolution	Chapter 2 (37-66)
Thurs Jan 12	4	Evolutionary Analysis 1: Experiment & Observation	Chapter 10 (p. 369-381)
Thurs Jan 12	DUE: Quiz for 'Evo-short 1' (Rock Pocket Mouse)		Click 'save and submit' before 11pm
Thurs Jan 12 No tutorial, review documentary on your own time	Documentary 1 online	'Evolution: Great Transformations'	Blackboard: Course materials > Documentaries Quiz →due Tues Jan 17, 11pm
Tues Jan 17	5	Analysis 1 (continued), Analysis 2: Phylogeny & Comparative method	Chapter 3 (p. 382-387); Chapter 4 (p. 109- 123; 137-139)
	DUE: Quiz for Documentary 1 (Transformations)		Click 'save and submit' before 11pm
Thurs Jan 19	6	Analysis 2 (continued): Phylogeny & Comparative method	--
	Evo-short 2 online	Recap: Lizards in an evolutionary tree	Blackboard: Course materials > Evo-Short2 Quiz →due Thurs Jan 26, 11pm
Tues Jan 24	7	Mutation & Variation	Chapter 10 (p.387-389); Chapter 5 (p. 147-174)
Thurs Jan 26	8		
Thurs Jan 26	DUE: Quiz for Evo-short 2 (Lizards)		Click 'save and submit' before 11pm
Thurs Jan 26	Problem set 1 online		Blackboard: Course materials > Problems, → Due Thurs Feb 2
Tues Jan 31	9	Mechanisms of Evolution 1: Hardy-Weinberg, Mutation & Selection	Chapter 6 (p. 179-227)
Thurs Feb 2	10		
Thurs Feb 2 TUTORIAL	5pm –6pm	Lecture catch-up; Topic: TBA	
Tues Feb 7	DUE: Problem set 1		Click 'save and submit' before 11pm
Tues Feb 7	11	Mechanisms 2: Patterns of Selection	Chapter 7 (p. 233-259, & 275-282)
Thurs Feb 9	12	Mechanisms 3: Migration, Drift & Non-random mating	
	Online, questions & solutions	Practice problem set 2	Not for marks. Use as a study tool.
Tues Feb 14	13	Mechanisms 4: Case Studies	Chapter 7 (p. 283-284)
Thurs Feb 16	14		

Date	Lecture #	Topic	Readings (Freeman & Herron, 5th ed)
Friday Feb 17	CONFIRMED Term Test . 15:00 to 17:00		
Material from Jan. 3 – Feb. 9 (Lec 1 – 12; Feb 2 Tut; Documentary 1, Evo-Shorts 1 & 2; Problem sets 1&2)			
Feb 21-25	Reading week		
Tues Feb 28	15	Evolution & viruses: Case study of HIV	Chapter 1 (p. 1-30); Chapter 10 (p. 397-401)
Thurs Mar 2	16		
	Documentary 2 online	Doc 2. 'Evolution: The Eternal Arms Race'	Blackboard: Course materials > Documentaries → Due Thurs Mar 9
Tues Mar 7	17	Quantitative genetics 1: Continuous traits & Heritability	Chapter 9 (p. 329-334; 343-347)
Thurs Mar 9	18	Misuse of heritability: IQ & 'Race'	Chapter 6 (p. 214-216); Chapter 9 (p. 360-364)
Thurs Mar 9 TUTORIAL	5pm – 6pm	Review session: email questions to biob51@uts.utoronto.ca by Wed March 8.	
Tues Mar 14	19	Selection & speciation 1	Chapter 9 (p. 356-360), Chapter 16 (616-631)
	Due: Quiz for Documentary 2		Click 'save and submit' before 11pm
	ONLINE	Documentary 3: Extinction!	Blackboard: Course materials > Documentaries → Due Tues Mar 21
Thurs Mar 16	20	Selection & Speciation 2	--
Tues Mar 21	DUE: Quiz for Documentary 3 (Extinction!)		Click 'save and submit' before 11pm
	ONLINE	Practice problem set 3	Blackboard: Course materials > Problems → Due Thurs Mar 30
	21	Darwin's Dilemma 1: Sexual selection & Evolution of Sex	Chapter 8 (p. 314-324); Chapter 11 (p. 407-437)
Thurs Mar 23	22		
Tues Mar 28	23	Darwin's Dilemma 2: Social Behaviour & Altruism	Chapter 12 (p. 455-464, 466-467; 481-486)
Thurs Mar 30	24		
DUE: Practice Problem set 3		Click 'Save and Submit' before 11pm	
April 1-4	Study Break		
Exam Period April 5-22	FINAL EXAM (all material, including videos) Bring a non-programmable calculator. Date/time TBA by Registrar <ul style="list-style-type: none"> • ~1/2 of exam: Feb 14 – Mar 30 (Lec. 13 – 24, Documentaries 2 & 3, Problem set 2) • ~1/2 of exam: cumulative, all course material 		