

# Biology 222 – Evolution – Syllabus – Spring 2023

Professor Daniel E. Bunker

Summary: Evolution is happening right now in every living species on planet Earth. Evolutionary biology is not about bones and fossils – they are just helpful clues nature has left for us. Evolutionary biology is all about genes and populations, mutations and natural selection, reproduction and survival. Evolution cuts across and unifies the biological sciences – from genetics and molecular biology to ecology and conservation biology to disease and medicine, evolution informs our understanding. Indeed, as the renowned geneticist Theodosius Dobzhansky observed, “Nothing in biology makes sense except in the light of evolution.”

## Learning Objectives

Upon successful completion of this course, students will:

- Understand evolutionary mechanisms including genetic drift and natural selection
- Understand how to construct and interpret phylogenetic trees
- Understand the history and geography of life on Earth
- Understand the species concept and mechanisms of speciation
- Understand mechanisms of evolution of life history, sexual selection, coevolution, and evolution of disease.

Course prerequisites: (BIOL 201 and BIOL 202 or R120 201 and R120 202) and (BIOL 205 and BIOL 206 or R120 205 and R120 206) with grade of C or better.

Bio 222-002 meets: Tuesday and Thursday, 10:00 am – 11:20 am

Location: CKB G-08

Bio 222-004 meets: Tuesday and Thursday, 2:30 pm – 3:50 pm

Location: CKB G-08

## Required Materials:

1. **Text: Evolution**, by **Bergstrom and Dugatkin, 2<sup>nd</sup> Edition**. ISBN: 978-0-393-92592-0, Norton & Co. Note that they offer the text as a more affordable eBook. **IMPORTANT:** The 2<sup>nd</sup> edition is very different from the 1<sup>st</sup> edition which is not an acceptable substitute. **ORDER THE BOOK RIGHT NOW!!!**
2. **A computer that can run Lockdown Browser.**

## Grading:

Quizzes	5%
In-class activities	15%
Exam 1	20%
Exam 2	20%
Exam 3	20%
Exam 4	20%

### Grading scale:

A	90-100	C	70-78
B+	88-90	D	60-70
B	80-88	F	0-60
C+	78-80		

Note that these cutoffs are precise. Final point totals above 90 are an A, while point totals below 90 (but above 88) are a B+. I do not round up (or down!). Students that ask me to round up will be assessed a 1% debit on their final grade.

### Contact info and office hours:

Email: [dbunker@njit.edu](mailto:dbunker@njit.edu)

Office hours: Monday 2-3:30 pm and Thursday 11:30 am – 1 pm.

Office hours location:

<https://njit-edu.zoom.us/my/profdbunker?pwd=MUJHamFMVnY0eUdHNENyWFJjaIVYZz09>

Appointments are required for office hours meetings! Email me at: [dbunker@njit.edu](mailto:dbunker@njit.edu)

Course Web page: Canvas (<https://canvas.njit.edu>).

We will use Canvas for coursework submission, for announcements, for exams and quizzes, and for various activities. If you have not used NJIT canvas before, go here <<https://ist.njit.edu/ucid/>>, or call the NJIT helpdesk for assistance (973 596 2900). Be sure to check your NJIT email or set it to forward to your everyday email account. Check Canvas regularly for assignments, quizzes, announcements, etc. Your course grades can be found on canvas as well.

## **HOW THE COURSE WORKS:**

### CLASS MEETINGS

- We will generally cover one chapter/topic each day that the course meets. You will read the chapter and review the pre-recorded lecture BEFORE the class when we cover the material. In class we will have a QUIZ on the material, a discussion of the quiz results, and time for questions about the chapter. Most days we will have some sort of activity that will help you better understand the topic. All of these activities are REQUIRED. These activities happen when they are scheduled and cannot be made up!! However I will drop a few quiz and activities scores.
- FOR EACH LECTURE, you will:
  - READ the chapter in the textbook, Bergstrom and Dugatkin, BEFORE CLASS
  - REVIEW the pre-recorded lecture posted to Canvas, BEFORE CLASS
    - Note that I also post the lecture slides themselves.
  - ATTEND class
    - Take the QUIZ at the beginning of class.
      - QUIZZES will be on canvas, using Lockdown Browser (see EXAMS, below).
      - This is the only time the quiz is available!!
    - Participate in discussions and activities
- Bring your laptop (or iPad) to class with you every day!

## EXAMS

- You will take four exams. The exams are not cumulative, although topics covered later in the course do build upon fundamentals (natural selection, reading phylogenies, etc)
- All exams AND QUIZZES will be in class on Canvas and will require Lockdown Browser. You MUST have a computer that is capable of running Lockdown Browser. Contact the Dean of Students if you need assistance acquiring the necessary hardware.
- We use Lockdown Browser simply to verify that your work is your own and to prevent cheating on exams. Cheating on exams violates the NJIT honor code and also devalues your degree – if NJIT is known for cheating, future employers or schools will not trust that you have learned anything from your NJIT courses. When your classmates cheat, they are devaluing your college degree and stealing from you. Cheating in any form will not be tolerated in Bio 222.

## NOTE

- Each chapter also has learning objectives and flashcards which are posted on Canvas and which you may find useful.

### Makeup Policy:

**Exams** can only be made up with permission from the Dean of Students or with prior approval from Prof. Bunker. If you miss an exam for unforeseen circumstances, plead your case to the Dean of Students. If you have a conflict with an exam, you must contact me WITHIN THE FIRST TWO WEEKS OF CLASS to make alternative arrangements.

**Quizzes** and **in-class** activities cannot be made up. They happen in real time!! I will drop four of each of these from your grade – use these free passes wisely.

### Disability accommodations:

If you need accommodations due to a disability please contact the Office of Accessibility Resources and Services to discuss your specific needs. A Letter of Accommodation Eligibility from the Disability Support Services office authorizing your accommodations will be required.

### Academic Integrity:

You are expected to abide by the NJIT Code of Student Conduct <<https://www5.njit.edu/doss/policies/conductcode/index.php>> and the NJIT University Code on Academic Integrity <<http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf>>, which you agreed to do upon entering NJIT. Please re-read the NJIT University Code on Academic Integrity, which describes conducts that are considered unethical and thus unacceptable (cheating, violating the US Copyright law, etc), as well as consequences for violating the Code. I will not tolerate cheating – it is my responsibility to protect my honest students from cheaters and I will do so. Cheating during exams will not be tolerated, nor will any form of plagiarism.

***“Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: <http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf>. Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. **Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university.** If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at [dos@njit.edu](mailto:dos@njit.edu)”***

Cellular Phones: All cellular phones must be switched off during all class times.

### Key Dates:

Jan. 23: Last day to add/drop.

Jan. 23: Last day to withdraw with 100% refund

Jan. 30: Last day to withdraw with 90% refund

**Feb. 7: Exam 1.**

Feb. 13: Last day to withdraw with 50% refund

**March 2: Exam 2**

Mar. 6: Last day to withdraw with 25% refund

Mar. 13-18: Spring break

April 3: Last day to withdraw.

**April 4: Exam 3**

April 27: Last day of classes for Evolution

**April 27: Exam 4**

May 2: NO CLASS – Friday schedule

**Course outline, assignments, and exam schedule:**

Day	Date	Topic/Chapter	Preparation
Tue	17-Jan	An Overview of Evolutionary Biology & Logistics	Read Ch. 1
Thu	19-Jan	Early Evolutionary Ideas and Darwin's Insight	Read Ch. 2
Tue	24-Jan	Natural Selection	Read Ch. 3
Thu	26-Jan	Phylogeny and Evolutionary History	Read Ch. 4
Tue	31-Jan	Inferring Phylogeny	Read Ch. 5
Thu	2-Feb	Exam review	Bring your questions!!
Tue	7-Feb	<b>Exam 1</b>	Study for exam!
Thu	9-Feb	Transmission Genetics and Genetic Variation	Read Ch. 6
Tue	14-Feb	The Genetics of Populations	Read Ch. 7
Thu	16-Feb	Evolution in Finite Populations	Read Ch. 8
Tue	21-Feb	Evolution at Multiple Loci	Read Ch. 9
Thu	23-Feb	Genome Evolution	Read Ch. 10
Tue	28-Feb	Exam review	Bring your questions!!
Thu	2-Mar	<b>Exam 2</b>	Study for exam!
Tue	7-Mar	The Origin and Evolution of Early Life	Read Ch. 11
Thu	9-Mar	Major Transitions	Read Ch. 12
Tue	21-Mar	Evolution and Development	Read Ch. 13
Thu	23-Mar	Species and Speciation	Read Ch. 14
Tue	28-Mar	Extinction and Evolutionary Trends	Read Ch. 15
Thu	30-Mar	Exam review	Bring your questions!!
Tue	4-Apr	<b>Exam 3</b>	Study for exam!
Thu	6-Apr	Sex and Sexual Selection	Read Ch. 16
Tue	11-Apr	The Evolution of Sociality	Read Ch. 17
Thu	13-Apr	Coevolution	Read Ch. 18
Tue	18-Apr	Human Evolution	Read Ch. 19
Thu	20-Apr	Evolution and Medicine	Read Ch. 20
Tue	25-Apr	Exam review	Bring your questions!!
Thu	27-Apr	<b>Exam 4</b>	Study for exam!
Tue	2-May	NO CLASS - Friday Schedule!!!	

**NO FINAL EXAM during final exam period!!!!**