

Evolution IB 302 – Course Syllabus Spring 2025

Instructors

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Course Information

Course website: <https://canvas.illinois.edu/courses/53325>

Lecture Time & Location: 1-1:50PM MWF, 114 David Kinley Hall

Credit: 4 hours

Prerequisites: IB150, MCB150, IB204

Communication

If you have questions on course logistics, planned absences, homework or exam questions, please contact the Course Coordinator (Minxing Zhu). If you have questions regarding the labs or lab assignments, first contact your lab TA, and if that does not resolve your question/issue, contact our Lab Coordinator (Dr. Lily Arias).

Required Texts and Materials

1. *Evolutionary Analysis*, Fifth Edition, Jon C. Herron, Scott Freeman, and Benjamin Cummings
 - a. Physical copies are available at the University Bookstore.
 - b. E-Textbook: <https://www.vitalsource.com/products/pearson-etext-for-evolutionary-analysis-instant-jon-herron-scott-freeman-v9780137521029>
2. Lab Manual Online in Canvas (updated each week)

Introduction to IB 302

“Nothing in biology makes sense except in light of evolution” – T. Dobzhansky.

Welcome to Evolution! Evolution is the unifying concept of biological science. Most people are familiar with evolution as the subject of controversy in elementary and high school education. In reality, evolutionary ideas link all the different fields of biology.

This course provides a rigorous and broad foundation for the theory of evolution by natural selection, emphasizing modes of selection, such as sexual and kin selection, and alternative evolutionary forces, such as genetic drift. IB 302 provides an introduction to analytical frameworks, including population and quantitative genetics, the neutral theory, and the use of evolutionary trees – phylogenetics. These topics are explored using examples from the scientific literature with applications to human health and medicine, conservation, genomics, human evolution, and the fossil record.

Student Learning Outcomes

1. Students learn how evolution is the central theoretical explanation for all of life and all its diversity of form and function.
2. Students learn that evolution is a significant part of understanding who we are as humans.
3. Students learn practical skills like constructing phylogenetic trees (used in understanding the great diversity of medically important bacteria and viruses), calculating the statistics of genetic differences between populations (used in medical genetics), and calculating genetic relatedness of individuals (used in forensics).

Course Structure

IB302 is a four-hour credit course, and it therefore has both lecture and lab components. The lecture component will comprise 70% of your final grade, and the laboratory component will comprise 30%. You should expect to spend 9 hours per week outside of class working on course and lab materials.

Course Component	Points	Percent	Participation		
Exam 1	150	15%	Component	Points	Percent
Exam 2	150	15%	Homework Assignments	132	13.2%
Exam 3	150	15%	In-Class Participation	118	11.8%
Participation	250	25%	Participation Total	250	25%
Labs	300	30%			
Course Total	1000				

Labs

There will be 12 weekly labs, each is worth 25 points. If you miss a lab, you may attend another lab section during the same week, at the discretion of the TA in charge of the section. Labs will not be accepted once the due date has passed without an excused absence.

Week	Lab	Points	Percent
Week 1	No Lab		
Week 2	Lab 1 - Sars-CoV-2 Viral Evolution	25	8.3%
Week 3	Lab 2 - Evolution and Society	25	8.3%
Week 4	Lab 3 - Phylogeny	25	8.3%
Week 5	Lab 4 - Genetic Drift	25	8.3%
Week 6	Lab 5 - Natural Selection	25	8.3%
Week 7	Lab 6 - Quantitative Genetics	25	8.3%
Week 8	Lab 7 - Sexual Selection	25	8.3%
Week 9	Lab 8 - Human Evolution	25	8.3%
Week 10	Lab 9 - Fossils	25	8.3%
Week 11	Lab 10 - Diversity Presentations	25	8.3%
Week 12	Lab 11 - Insect Diversity and Phylogenetics, Part 1	25	8.3%
Week 13	Lab 12 - Insect Diversity and Phylogenetics, Part 2	25	8.3%
Week 14	No Lab [Reserved for make-ups]		
Lab Total		300	30%

Homeworks

There will be 12 weekly homeworks. Each is worth 12 points and we will drop your lowest grade. Late homeworks will not be accepted.

In-class Participation

Students are responsible for bringing a working iClicker to class. Each individual class with an iClicker question will provide 2 points toward the participation grade. *If a student is found using an iClicker of another student or misusing the iClicker system it will be considered a violation of Academic Integrity.*

In addition, once a week we will use class time for in-class assignments. For these assignments, you will work in groups, and you will turn in the in-class work which will be worth 4 points per assignment toward the participation grade. We will drop your lowest in-class assignment score. *Note: if your DRES accommodations allow you to miss an in-class assignment, you may contact the instructor for a make-up assignment which will generally be a written summary of the missed lecture.*

If a student were to complete all in-class assignments (iClicker and group work), they would earn 134 total points. However, the participation grade maxes out at 118 points, so it is possible to miss a few participation assignments without affecting your grade. This means it is not possible to make up participation points if missed, whether or not a particular absence is excused.

Exams

You must take all three exams. If you have a known conflict, you must notify the instructors in advance. If you have an unavoidable medical or personal emergency, then you may take a make-up exam given the absence is properly documented (see below). Exams will cover lecture material, assigned readings, and material covered in labs, homework and recommended problems. You may use basic scientific calculators for exams.

Final Exam

There is no mandatory final exam for this course. However, ***an optional, cumulative final exam*** will be given during the course final exam slot. If you take the final exam, your lowest exam score will be replaced with the final exam score, assuming it is higher. You cannot replace a missed exam using this final exam option and you cannot reduce your score if you score worse on the final exam.

Expectations of Students

Students are expected to:

1. Come to class (lecture and lab);
2. Read the textbook before each lecture. Read the lab manual and reading for discussion before each lab;
3. Complete the weekly homework assignment online (similar questions will be on exams);
4. Read and abide by the Code of Policies and Regulations Applying to All Students at <https://studentcode.illinois.edu/index.html>.

Please be aware that this syllabus may change during the semester. Changes to the syllabus will be announced in class and on the Canvas site.

No Screens Policy

Phones are not permitted for use during lecture. Laptops and tablets are permitted for course-related purposes, such as note-taking, and calculators are allowed for in-class activities, quizzes, and exams. Students using phones during lecture or using laptops or tablets for non-note-taking purposes, will

first be asked to put the device away, then asked to leave after subsequent violations; any missed points will not be allowed to be made up.

Absences

Attendance in lecture, labs, and exams is mandatory. Lectures or Labs will not be recorded or offered remotely. If a student will miss a lab, they may attend another lab section during the same week with the permission of the lab TA. If a student is absent from part of the course due to illness or a family emergency, work may not be made up without a note from the Dean of Students. For planned absences, students must make arrangements with the instructor prior to the event, at the discretion of the instructor. If a student is involved in a University-sponsored team or activity, military service or similar, requiring regular travel, arrangements for completing work off-schedule must be made at the beginning of the course.

Student Accommodations

To ensure that disability-related concerns are properly addressed from the beginning, students with disabilities who require assistance to participate in this class are asked to contact the instructors as soon as possible. All accommodations will follow the procedures as stated in Article 1, §1-110 of the Student Code (<https://studentcode.illinois.edu/article1/part1/1-110>).

Academic Integrity

According to the Student Code, “It is the responsibility of each student to refrain from infractions of academic integrity, from conduct that may lead to suspicion of such infractions, and from conduct that aids others in such infractions.” Academic integrity means being honest about your intellectual work. In the context of our course, this means that you assert that work you submit for the course is a product of your own intellectual effort and not the work of someone else. Please know that it is our responsibility as instructors to uphold the academic integrity policy of the University, which can be found here: <https://studentcode.illinois.edu/article1/part4>. Some specific examples of activities that are prohibited in the course and may result in serious penalties, up to receiving a failing grade in the course, include:

1. Cheating on exams, having someone else take your exam, or having someone else answer in-class questions in your absence;
2. Copying the work of others (plagiarism), whether during an exam or in homework or lab work;
3. Posting of course materials, including, but not limited to, lectures, assignments, or test questions, on any website or in any online forum, whether privately or publicly available.

Incidences regarding academic integrity may be adjudicated through the University Faculty Academic Integrity Reporting system.

Copying material to outside sources

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We ask you to refrain from doing so because we put considerable effort into creating material for the course and we wish to maintain control over that material to enhance the experience of students yet to take Evolution.

We routinely monitor online websites and forums to ensure course materials are not being redistributed.

Maintaining a good learning environment

We expect everyone to be respectful of TAs, class members, and instructors. During lecture or lab, we should all maintain an environment conducive to learning and refrain from interrupting the course environment. Harassment or other like misconduct will not be tolerated. We are all responsible for creating a positive and safe environment that allows all students equal respect and comfort.

Sexual Misconduct Policy and Reporting Statement

The University of Illinois is committed to combating sexual misconduct. Faculty and staff members are required to report any instances of sexual misconduct to the University's Title IX and Disability Office. In turn, an individual with the Title IX and Disability Office will provide information about rights and options, including accommodations, support services, the campus disciplinary process, and law enforcement options. A list of the designated University employees who, as counselors, confidential advisors, and medical professionals, do not have this reporting responsibility and can maintain confidentiality, can be found here: <https://wecare.illinois.edu/resources/students/#confidential>. Other information about resources and reporting is available at <https://wecare.illinois.edu>.

Support Resources and Supporting Students in Distress

As members of the Illinois community, we each have a responsibility to express care and concern for one another. If you come across a classmate whose behavior concerns you, whether in regards to their well-being or yours, we encourage you to refer this behavior to the Student Assistance Center (1-217-333-0050) or online at <https://odos.illinois.edu/community-of-care/referral/>. Based upon your report, staff in the Student Assistance Center reaches out to students to make sure they have the support they need to be healthy and safe. Further, as a Community of Care, we want to support you in your overall wellness. We know that students sometimes face challenges that can impact academic performance (examples include mental health concerns, food insecurity, homelessness, personal emergencies). Should you find that you are managing such a challenge and that it is interfering with your coursework, you are encouraged to contact the Student Assistance Center (SAC) in the Office of the Dean of Students for support and referrals to campus and/or community resources. The SAC has a Dean on Duty available to see students who walk in, call, or email the office during business hours. For mental health emergencies, you can call 911 or contact the Counseling Center.

Family Educational Rights and Privacy Act (FERPA) Statement

Any student who has suppressed their directory information pursuant to Family Educational Rights and Privacy Act (FERPA) should self-identify to the instructor to ensure protection of the privacy of their attendance in this course. See <https://registrar.illinois.edu/academic-records/ferpa/> for more information on FERPA.

Weekly Schedule

Week	Class	Topic	Reading
1 (Jan. 20)	M	No Class – Martin Luther King, Jr. Day	
	W	Introduction - HIV & Evolution	Chapter 1
	F	HIV & Evolution	Chapter 1
2 (Jan. 27)	M	HIV & Evolution	Chapter 1
	W	The Pattern of Evolution	Chapter 2
	F	Natural Selection	Chapter 3
3 (Feb. 3)	M	Phylogeny: Reading and Making trees	Chapter 4
	W	Variation	Chapter 5
	F	Mendelian Genetics 1: Selection and Mutation	Chapter 6
4 (Feb. 10)	M	Mendelian Genetics 1: Selection and Mutation	Chapter 6
	W	Mendelian Genetics 2: Migration and Drift	Chapter 7
	F	Mendelian Genetics 2: Migration and Drift	Chapter 7
5 (Feb. 17)	M	Mendelian Genetics 2: Migration and Drift	Chapter 7
	W	Linkage and Sex	Chapter 8
	F	Exam 1	
6 (Feb. 24)	M	Linkage and Sex	Chapter 8
	W	Quantitative Genetics	Chapter 9
	F	Quantitative Genetics	Chapter 9
7 (Mar. 3)	M	Adaptation	Chapter 10
	W	Adaptation	Chapter 10
	F	Sexual Selection	Chapter 11
8 (Mar. 10)	M	Sexual Selection	Chapter 11
	W	Sexual Selection	Chapter 11
	F	Aging and life history	Chapter 13
(Mar. 17)		No Class – Spring Break	
9 (Mar. 24)	M	Social Behavior	Chapter 12
	W	Social Behavior	Chapter 12
	F	Aging and life history	Chapter 13
10 (Mar. 31)	M	Evolution and Human Health	Chapter 14
	W	Evolution and Human Health	Chapter 14
	F	Exam 2	
11 (Apr. 7)	M	Genome Evolution	Chapter 15
	W	Genome Evolution	Chapter 15
	F	Genome Evolution	Chapter 15
12 (Apr. 14)	M	Species and Speciation	Chapter 16
	W	Species and Speciation	Chapter 16
	F	Origin and Evolution of Early Life	Chapter 17
13 (Apr. 21)	M	Origin and Evolution of Early Life	Chapter 17
	W	Evolution and the Fossil Record	Chapter 18
	F	Evolution and the Fossil Record	Chapter 18
14 (Apr. 28)	M	Evolution and the Fossil Record	Chapter 18
	W	Development and Evolution	Chapter 19
	F	Development and Evolution	Chapter 19
15 (May 5)	M	Exam Review	
	W	Exam 3	

The following schedule and set of topics is subject to change, depending on the pace of class and other factors