

IB 151 Syllabus and Course Policies

Labs: In person lab sessions (No lab in week 1. Class meets in NHB 3100).

Labs require the lab manual (check your class schedule for your lab time.)

Professor: Dr. Benjamin Clegg

Course email: ib151-course@illinois.edu

Course Webpage

You will find links to lecture lessons, discussion sessions and other assignments each week **on the CANVAS course webpage:**

canvas.illinois.edu

Login with your University NetID and password. We recommend that you bookmark this page after you accessed the course page for the first time.

Required Materials

(Required) Spring 2024 IB 151 lab manual.

(Required) A calculator capable of taking a square root.

(Recommended) Computer/Laptop with internet connection. If you do not have one, you can request assistance with these items from: <https://odos.illinois.edu/community-of-care/student-assistance-center/>

Tentative Class Schedule

Below is a **tentative** class schedule, highlighting the relationship between Lectures, Discussions and Readings. We reserve the right to make changes to the class schedule. Please consult the course homepage at canvas.illinois.edu for assignment due dates and to check for any updates to this schedule.

	Lab Projects	Project title	Pre-lab write-up (due start of class)	Lab book Submission (due end of class)	Semester Project Submission schedule
Week 1 Jan. 15-21	No labs this week				
Week 2 Jan. 22-28	Project 1	Circulatory system physiology		Project 1 submission	Semester project statement of interest (submission due Friday)
Week 3 Jan. 29 - Feb. 4		Semester Project Workshop 1 Public outreach project planning	How to Research Scientific Literature		Annotated Bibliography (submission due end of class)
Week 4 Feb. 5-11		Semester Project Workshop 2 Public outreach materials development	--		Outreach Project submission (submission due Sunday)
Week 5 Feb. 12-18	Project 2	Genetic basis of phenotypic traits Part I: DNA extraction & PCR	Project 2, Part I pre-lab due	--	
Week 6 Feb. 19-25		Part II: Digestion & gel electrophoresis	Project 2, Part II pre-lab due	Project 2 submission	
Week 7 Feb. 26 – Mar. 3		Semester Project Workshop 3 Genetic Basis of Trait	--	--	Background & Genetic Basis of Trait (submission due end of class)
Week 8 Mar. 4-10	Project 3	Identifying Modes of Inheritance Part I: Setting up the crosses	Project 3, Part I pre-lab due	--	
Week 9 Mar. 11-17		Spring Break			
Week 10 Mar. 18-24		Part II: Data collection & analysis	Project 3, Part II pre-lab due	Project 3 submission	
Week 11 Mar. 25-31	Project 4	Phylogenetics on mitochondrial DNA Part I: DNA extraction, quantification, PCR	Project 4, Part I pre-lab due	--	
Week 12 Apr 1-7		Part II: DNA sequencing	Project 4, Part II pre-lab due	--	
Week 13 Apr. 8-14		Wellness Week: no classes			
Week 14 Apr. 15-21		Semester Project Workshop 4 Population genetic analyses	--	--	Population Genetics (submission due end of class)
Week 15 Apr. 22-28		Part III: Data analysis & tree building	Project 4, Part III	Project 4 submission	
Week 16 Apr. 29 – May 1	IB 151 conference Wednesday May. 1 st , 7-10 pm on 3 rd floor of NHB				Semester project presentation

Course Grade Scale.

Letter Grade	Percentage Range (rounded to nearest %)
A+	>96.50
A	92.50–96.49
A–	89.50–92.49
B+	86.50–89.49
B	82.50–86.49
B–	79.50–82.49
C+	76.50–79.49
C	72.50–76.49
C–	69.50–72.49
D+	66.50–69.49
D	62.50–66.49
D–	59.50–62.49
F	0–59.49

Course Grade Structure.

Course Component	# assign	Pts/ assign	Point total	Comments
Pre-labs / Attendance	12	2	24	Attendance & Pre-lab scores recorded at beginning of labs (see course schedule for which weeks have a pre-lab due). You will lose all attendance points if you leave class without being excused by your TA!
Lab Project Reports	4	5	20	Lab reports are due at the end of each of the 4 projects, several of which are multi-week long units. See the course schedule for which weeks have lab reports due and see the back of the cover sheet for each project for the grading rubric.
Semester Project:			56	
Part 1: Public Outreach Project				
How to Research Scientific Literature	1	1		
Project Selection	1	5		
Annotated Bibliography	1	5		
Outreach project submission	1	10		
Part 2: Professional scientific presentation				
Genetic Basis of Trait	1	5		
Population Genetics	1	5		
Slide submission	1	5		
Team member evaluation	1	5		
Conference Presentation	1	15		
COURSE TOTAL			100	

Course Policies

IB 151 is a lab course that accompanies IB 150 “Organismal and Evolutionary Biology”. This course is designed for students in majors that require 1 semester or 1 year of major’s level college biology with lab.

Our goal this semester is to gain experience in doing hands-on science in the context of organismal biology to understand how biologists can use manipulative experiments to gain insights into the biological world.

This lab course is meant to be an experience akin to an internship in a biological research lab that allows you to experience doing genuine scientific investigations. Through a sequence of four lab project and a semester-long independent research project you will be increasingly challenged to define your own research questions and take an active part in designing experiments in the context of physiological, genetic, and evolutionary research topics. In the process you will learn how professional biologists set up their research questions, derive their hypotheses, design experiments, and record and analyze their results.

IB 151 requires concurrent (or prior) enrollment in IB 150, and the lab projects generally follow the units of IB 150 closely: Unit 1: Physiology & Ecology; Unit 2: Genetics; Unit 3: Evolutionary Biology.

Course Components

Pre-lab assignments

Prior to your first lab in Week 2, completion of the online lesson “How to Research Scientific Literature” is required, worth 3 points. The link is in the Semester Project tab on the course webpage.

As of Week 5 (Project 2), each lab session associated with a project (other than the semester project) will have a pre-lab due that requires students to have read the associated background section in the lab manual, and have summarized the research question, hypotheses, and the steps of the experimental design in their lab book notes. Detailed instructions and a rubric for the pre-lab assignments are available in Appendix I of the lab manual. Pre-labs are due and will be checked by your TA at the beginning of your lab session in weeks where these are due, and are worth 2 points per lab.

Lab reports

As you conduct your experiment, you will be recording the data you collect, perform statistical analyses, and interpret your results in your lab book beneath your pre-lab assignments. You will turn in the complete set of pre-lab(s) and lab notes you took during your lab sessions associated with 4 projects at the end of the last lab session associated with a project. Lab projects range from a single lab session to three lab sessions, and lab reports are only due once at the conclusion of each project. See the course schedule for the due dates. Lab reports are worth 7 points each. A rubric for lab reports is available in Appendix I of the lab manual.

Semester Project

The semester project allows you to engage with a topic that relates to your personal interests as a team. The project comes in two parts: 1) A public outreach component, and a 2) professional scientific presentation, and allows you to also develop strong collaborative teamwork skills.

Outreach Project component: Communicating scientific findings to the general public is becoming an ever-more pressing skill, as widespread misunderstanding and miscommunication of scientific findings and a general mistrust of the sciences is becoming more common. This component of your semester project will result in submission of a public outreach project in a medium relevant to your target audience. The outreach project is worth 10 points.

Scientific Presentation component: The semester project emphasizes hypothesis-based reasoning, and professional written and oral communication skills. As a professional in a science-related field (be it as a research biologist, a medical professional, work in biotech or other scientifically-influenced industries, or as a consultant in biologically-related fields), concise, precise, and informative communication of your findings are two of the top skills that professional schools and employers are looking for.

The overall project is broken into smaller chunks each worth 5 points, plus the final presentation in a conference setting, worth 15 points. You are expected to work on each part in class, as well as in your own time as a well-functioning research team. Due dates for each part are listed in the course schedule.

This project results in a talk at the IB 151 Conference that represents the “final exam” of the course. At this conference your team will summarize the state of the art of our understanding on the topic you chose, road blocks that currently hinder solutions to the problem, and avenues (proposal of directions) of research that could lead to a solution in the future.

You will have an opportunity to give feedback on your team members’ collaboration skills.

Late Assignments, Missed Attendance, Section Change

Late Submissions of Assignments

Pre-lab assignments are typically due at the beginning of your lab session, unless otherwise noted. Lab reports will always be due at the end of the last lab session of each of the four projects. Semester Project components are typically due end of day Friday and are submitted online. All assignments **must be completed on time**. Late submissions will NOT be graded, unless incurred due to extenuating circumstances. Proper documentation for illness, family emergency, athletic event or other legitimate reason is required in order to receive an extension for submitting assignments late.

Please consult the Student Code Article 1, Part 5 to check whether a particular reason for absence is eligible for late submission of work: http://studentcode.illinois.edu/article1_part5_1-501.html.

Missed Lab Attendance

You must attend your lab to earn the points associated with each lab's assignments. If you need to miss lab due to a legitimate, University-sanctioned emergency (see above), we strongly encourage you to e-mail ib151-course@illinois.edu at least 3 days in advance to schedule an alternate lab time for the affected week. If that is impossible, your lab score will be excused as appropriate, once your documentation has been approved.

Section Changes, Add and Drop Information

Use the UI Enterprise System. Instructors or TAs cannot perform any registration functions for you. Students must attend the lab sections in which they are enrolled unless they have received authorization from their TA to attend a make-up section. Make-up requests may be denied if a section is full. Apply at your College Office before the deadline if you wish to elect the Credit/No Credit option. To drop the course after the drop deadline, students must petition a Dean in their College Office.

Late Registration

If you add the course late, you need to contact ib151-course@illinois.edu within 24 hours of adding the course to have due dates extended one week following your add date to allow the opportunity to complete any missed assignments. Missed lab periods due to a late add will be excused if brought to our attention.

Academic Integrity

All students are responsible for reading the [University of Illinois Student Code](#). Pay particular attention to http://admin.illinois.edu/policy/code/article1_part4_1-402.html concerning plagiarism and cheating.

- Penalties for plagiarism on course assignments result in a reduced grade for the assignment and a note in your student file. Plagiarism is the copying or leaning on sources without properly citing your source. To avoid a charge of plagiarism, all submissions need to be your own synthesis of information, demonstrating *your own* understanding, and any sources you used to obtain information from must be properly attributed at the end of your submissions.
- Copying or leaning on unauthorized student files or keys obtained from other students (downloaded from the web or sharing of physical copies) will be charged as **cheating** and the use of unauthorized materials rather than a charge of plagiarism, and results in a score of zero on the assignment and will receive a note of this academic violation in your student record.

Additional penalties may be imposed by the university, including dismissal from the university, depending on the presence of aggravating factors or if this was not your first infraction.

Getting Help

- Only contact your instructor directly if you have a personal question.
- For all other questions about course content, activities, deadlines, technical problems, etc., please check the **General Q & A forum** at the top of the Canvas Course Webpage to see if someone else has already asked your same question and received a response.
- If your question isn't there yet, post your question to the **General Q & A forum**.
- Feel free to answer peers in the General Q&A Forum if you know the answer!
- If you still have a question, email ib151-course@illinois.edu.

Disability Accommodations

To obtain disability-related academic adjustments and/or auxiliary aids, students with disabilities must contact the course instructor and the Disability Resources and Educational Services (DRES) as soon as possible. To contact DRES you may visit 1207 S. Oak St., Champaign, call 333-4603 (V/TTY), or e-mail a message to disability@illinois.edu

Run > Hide > Fight

Emergencies can happen anywhere and at any time. It is important that we take a minute to prepare for a situation in which our safety or even our lives could depend on our ability to react quickly. When we're faced with almost any kind of emergency – like severe weather or if someone is trying to hurt you – we have three options: Run, hide or fight.



Run

Leaving the area quickly is the best option if it is safe to do so.

- ▶ Take time now to learn the different ways to leave your building.
- ▶ Leave personal items behind.
- ▶ Assist those who need help, but consider whether doing so puts yourself at risk.
- ▶ Alert authorities of the emergency when it is safe to do so.



Hide

When you can't or don't want to run, take shelter indoors.

- ▶ Take time now to learn different ways to seek shelter in your building.
- ▶ If severe weather is imminent, go to the nearest indoor storm refuge area.
- ▶ If someone is trying to hurt you and you can't evacuate, get to a place where you can't be seen, lock or barricade your area if possible, silence your phone, don't make any noise and don't come out until you receive an Illini-Alert indicating it is safe to do so.



Fight

As a last resort, you may need to fight to increase your chances of survival.

- ▶ Think about what kind of common items are in your area which you can use to defend yourself.
- ▶ Team up with others to fight if the situation allows.
- ▶ Mentally prepare yourself – you may be in a fight for your life.

Please be aware of people with disabilities who may need additional assistance in emergency situations.

Other resources

- ▶ police.illinois.edu/safe for more information on how to prepare for emergencies, including how to run, hide or fight and building floor plans that can show you safe areas.
- ▶ emergency.illinois.edu to sign up for Illini-Alert text messages.
- ▶ **Follow the University of Illinois Police Department** on Twitter and Facebook to get regular updates about campus safety.

Semester Learning Goals

After this course you will be able to:

Develop a hypothesis-driven approach to problems

- A) Differentiate between making objective observations, formulating hypotheses to explain observations, and deducing predictions from your hypotheses that would allow you to test whether your hypotheses are likely correct.
- B) Make biological observations and relate them to relevant biological principles
- C) Turn a biological observation into a narrow research question.
- D) Write a hypothesis as a statement that reflects a potential explanation/ mechanism that could plausibly cause the observed phenomenon.
- E) Deduce testable predictions from a hypothesis that are necessary, logical consequences of the hypothesis and unique to that hypothesis.
- F) Write testable predictions that relate the response of a dependent variable to changes in the independent variable.
- G) Develop and execute rigorous scientific experiments that allow you to evaluate the predictions associated with your hypotheses.

Understand how to use a manipulative experiment to answer questions with the scientific method

- A) Define and be able to write a hypothesis as a statement that reflects a potential explanation for the research question.
- B) Use deductive logic to derive unique, testable predictions to a hypothesis.
- C) Differentiate between independent and dependent variables, and use them appropriately to set up predictions of concrete results you would expect, *if* the hypothesis is correct.
- D) Graph qualitatively the predicted data, identifying which treatments are expected to differ significantly (more than expected due to chance alone).
- E) Set-up an appropriate experiment that controls for the independent variable and minimizes the effect of other environmental variables, and includes a control treatment and replication in its design.
- F) Identify the role and utility of control treatments, replication of treatments, and sample size in any experiment.

Research current state of scientific knowledge about a subject

- A) Know how to find sources of scientific information on the web and using library resources
- B) Classify a source as peer-reviewed primary literature vs. secondary scientific literature vs. op-eds, advertorials and similar opinion pieces
- C) Look up and paraphrase technical terms/jargon that you encounter that hinder your understanding of the text.
- D) Determine the scope of the topic(s) you need to understand to address your research question.
- E) Distinguish between relevant and less relevant information in your sources to gain an understanding of your topic (what do i already know about this topic, what do I still need to know, and what is currently unknown about this topic)
- F) Evaluate the rigor of the logical inferences used in a source, and the quality of the references the author draws upon to determine the reliability of the information you found about your topic.
- G) Synthesize (in your own words) what is already known about a topic based on your literature search, and properly reference the source for each bit of information you are including.

Develop team-based skills for scientific collaborations

- A) Develop an awareness of group participation and behaviors, both constructive and destructive, and encourage group cohesion and collaboration
- B) Clarify issues for the group by listening, summarizing, and focusing discussions
- C) Meet group deadlines and being an overall responsible group member, and follow-through with expectations and commitments
- D) Learn how to effectively delegate roles, tasks, and expectations and contribute to a group goal within your role
- E) Give thoughtful, relevant, and constructive criticisms (including via the peer-review process commonly used in science)
- F) Receive and incorporate constructive feedback in appropriate situations

Communicate scientific topics to the general public

- A) Rephrase scientific topics in layman's terms
- B) Recognize the audience that you are trying to inform and refrain from using unfamiliar scientific jargon
- C) Identify common misconceptions among your audience and engage them to help them overcome these
- D) Relate concepts to everyday experiences.
- E) Remain unbiased (or aware of pre-existing biases) and try to limit their effect

Communicate scientific concepts to other biologists (e.g. in a professional setting such as posters/papers/presentations)

- A) Identify the relevance of your research topic to society or towards advancing our understanding of an important biological concept
- A) Identify the purpose/goal of your presentation
- B) Lay out a logical structure that connects a presentation of the relevance of your research question to the conclusion of your results, and emphasize key points.
- C) Structure each paragraph around a topic sentence that introduces the next key point from your layout, and explaining its relevance/workings in the remainder of the paragraph.
- D) Back claims with reputable, scientific sources.
- E) Properly cite all your sources in a dedicated Reference section using standard citation formats for webpages, books, journals, and other sources.