

## BISC 1112 Lab Syllabus

**Lab Coordinator:** Hartmut Doebel, PhD  
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**office:** Lisner Hall 350  
**office hours:** Tuesdays 3:30 to 5:00  
Wednesdays 2:30 to 4:00  
Thursdays am (by appointment)  
Illuminate Live internet office hours (tba)  
→→ For questions about and help with labs, please, meet with your lab instructor!

### Description of Course:

This 4-credit course is the second in a sequence aiming at the science major who is required to take *General Biology* for majors. The course includes both, lecture and laboratory. Lectures will cover extensively the study of populations as it applies to ecology and evolution. This is followed by a detailed survey of the major taxa, and an evolutionary comparison of key physiological processes across taxa.

### Prerequisites:

While there are no formal prerequisites for taking BISC 012, I will rely on following knowledge taught in BISC 011. Please, make sure that you are familiar with the proper terminology and functional aspects of these topics.

- Cell structure and functions of organelles: Ch 6.2-5
- Cell Cycle; Chromosomal Structure; Meiosis: Ch 12.1,2; 13
- Mendelian Genetics: 14.1,2

### Overall Learning Goals:

1. To acquire lab skills (including dissections) for a better understanding of organism level biology.
2. To study ecological and/or evolutionary relationships.
3. To design, execute, and analyze experiments with sound scientific principles.
4. To develop scientific writing skills.
5. To develop critical thinking and analytical skills.
6. To deepen understanding of the major concepts presented during lecture.

### Texts:

Your own copy of the lab manual is required and available at Minuteman Press located at 2000 K Street NW. You also need to purchase a copy of "A Photographic Atlas for the Biology Laboratory, Sixth Edition" by Kent M Van De Graaff, John L Crawley (available in the GW bookstore).

## Learning Outcomes:

1. Understand and utilize all of the major steps of the scientific method.
2. Describe basic animal behavior using scientific language.
3. Design an experiment using simple animals to determine if an environmental change can play a role in their behavior.
4. Properly use primary scientific papers.
5. Explore the resource of Natural History Museum.
6. Investigate and understand the evidence of how life originated on Earth.
7. Explain the concepts of fossils, living fossils, and biological diversity.
8. Define, explain and give examples of all types of symbiotic relationships.
9. Develop an understanding of how co-evolution works and its effect on a population.
10. Understand and define biological fitness.
11. Calculate fitness values and understand the factors that change the fitness of different phenotypes.
12. Understand and analyze the Hardy-Weinberg theorem and the conditions under which it does and does not apply.
13. Understand and practice using the Chi Square test in testing a null hypothesis.
14. Understand why a null hypothesis can never be accepted, but either rejected or failed to be rejected.
15. Calculate allelic and genotypic frequencies in a population across many generations.
16. Recognize the major groups of plants.
17. Know major plant tissues
18. Understand plant adaptations needed to live on land.
19. Construct a simple cladogram using character states.
20. Design an experiment about resource competition using onion and lettuce seeds.
21. Practice using a compound microscope and understand its components, basic functions and abilities.
22. Understand basic protist characteristics and locomotive styles.
23. Understand diversity among protists
24. Construct a dichotomous key of unknown protists found in a lab sample.
25. Become familiar with the major phyla of the invertebrate.
26. Know the basic characteristics and constructs of various animal body plans.
27. Understand the morphological differences between protosome and deuterostomes.
28. Identify and understand the key organs and structures and their functions in crayfish and starfish.
29. Understand modern phylogenies of invertebrates in contrast to older classifications based on the division of protosome and deuterostomes.
30. Know and define the stages of early development.
31. Know the types of primary germ layer and their derived tissues.
32. Identify different types of human tissue, used prepared slides.
33. Know the different types of muscle cells and their functions.
34. Understand the functions of the different types of human tissues.
35. Explain muscle contraction and structure of the microscopic level.

36. Know the subphyla and classes in the phylum chordata and their distinguishing characteristics.
37. Learn how to do a careful dissection of a fetal pig.
38. Identify the structures and their functions in the fetal pig, especially the ones related to respiratory and digestive systems.
39. Dissect and identify the major blood vessels found in the fetal pig.
40. Understand the differences between fetal and adult blood circulation.
41. Study the route of blood circulation from the heart through the lungs (pulmonary circulation) and through the body (systemic circulation).
42. Trace a drop of blood from one point in the circulatory system, through all the major vessels and the heart, back to that same point.
43. Identify and know the functions of the organs found in the excretory system.
44. Identify and know the functions of the organs found in the reproductive systems of male **and** female specimens.
45. Trace a drop of urine produced in the kidney to where it leaves the fetus.
46. Trace the path of sperm from their site of production to where they leave the body.
47. Trace the development of eggs in the follicles and their movement to the uterus.
48. Observe and understand major human physiological processes.
49. Measure the changes in pulse in response to varying conditions.
50. Interpret analyzed data with the student's t-test.
51. To observe major types of human epithelial tissues.

### **Attendance Policy:**

Active presence at all labs is required.

- a. You have to come thoroughly prepared to each lab:
  - bring your own printed lab manual (Your lab manual is printed by Minuteman Press located at 2000 K St for under \$20.)
  - read **AND** study your lab manual
  - study sections in Campbell & Reece, the textbook you use for the lecture part of this course, when appropriate
  - be prepared to take a quiz each week (it will be part post-quiz [testing on the material of the previous lab]; and part pre-quiz [testing on the material of the current lab])
- b. You have to be ready to study and/or take a quiz when your lab is scheduled to start. If you come late, you will not be allowed to receive extra time for a quiz being in progress.

**Missing a Lab:**

If you absolutely need to miss a lab, you **MUST** notify prior to begin of the lab the following persons:

- a. your instructor, AND
- b. my assistant, Caitlin Pizzonia (cpizzonia95@gmail.com).

If you fail to do so, you will lose all points associated with the lab (no exceptions). If you follow proper notification procedure AND provide an acceptable written excuse (see below), then contact Caitlin Pizzonia in a very timely fashion, so that she can try to assign you to **another lab section during the same week**.

Please, note that most labs run at capacity and we cannot add more students to such labs as long as there are other labs that run below capacity. We are not able to consider your weekly schedule, i.e. we request flexibility on your part if you want to make up a lab. Thus, there is a risk that you will not be able to make up the lab and will lose all associated points - especially if you do not provide an acceptable written excuse (see below).

If you are given a one-time assignment to attend a new lab section - whether or not it fits your schedule, you have to attend the assigned section in order not to lose points. You will have to bring a written sign-in sheet to your new lab section (signed by Caitlin Pizzonia).

**Written excuses:**

A doctor's appointment is **NOT** an acceptable excuse - unless the doctor's note clearly states that this was indeed an emergency. Thus, your doctor's note clearly should state that you visited due to an emergency and/or that you need to rest for a certain number of days. If it says that you merely visited a doctor during the day of your missed lab, we won't accept this as an excuse.

Excuses for emergency family affairs need to be submitted by your school administration which, upon verification, will send a note to all of your professors.

**Missing two or more labs:**

If you miss two or more labs, you may lose credit for the entire course - even if you provide acceptable written excuses.

### Miscellaneous:

- Come on time and avoid being late! Be considerate.
- Respect others - and yourself.
- Do not cheat, plagiarize, or otherwise mislead your instructor. Unless explicitly stated to the contrary, all assignments are independent pieces of work (not group work) based on your own ideas and writing skills.
- Turn in all assignments on the due date. Late assignments will lose credit.
- Turn off cell phones; you will lose points if your phone rings, or you use it otherwise...
- Do not bring food to class. If you bring water, it must be in a bottle with a screw cap to avoid spills.
- Make use of office hours. Your instructor will help you.
- Any student who feels s/he may need an accommodation based on the impact of a disability should contact us privately **during the first two weeks of the semester** to discuss specific needs. Please contact the Disability Support Services office at 202.994.8250 in the Marvin Center, Suite 242, to establish eligibility and to coordinate reasonable accommodations. For additional information, please refer to <http://gwired/gwu.edu/dss/>.

### Preliminary Schedule (still subject to change; stay posted via Blackboard)

#### Week of

Jan 10 <sup>th</sup>	Meet and Greet
Jan 17 <sup>th</sup>	no classes meet: Natural History Museum (self-guided lab)
Jan 24 <sup>th</sup>	Scientific Method
Jan 31 <sup>st</sup>	Microscopic Life
Feb 7 <sup>th</sup>	Plant Evolution and Competition
Feb 14 <sup>th</sup>	Invertebrates
Feb 21 <sup>st</sup>	no classes meet (check plants)
Feb 28 <sup>th</sup>	Co-evolution of Predator/Prey and <b>Lab Midterm</b>
Mar 7 <sup>th</sup>	Development and Histology
Mar 14 <sup>th</sup>	no classes meet- Spring Break
Mar 21 <sup>st</sup>	Population Genetics
Mar 28 <sup>th</sup>	Fetal Pig 1
Apr 4 <sup>th</sup>	Fetal Pig 2
Apr 11 <sup>th</sup>	Human Physiology
Apr 18 <sup>th</sup>	<b>Lab Final</b>

## Grading:

### LAB:

9 Pre-lab quizzes	45 points
Midterm	40 points
Final	50 points
Lab Reports	20 points
Homework	45 points
Total Lab Points	200 points

**LECTURE:** 300 points

**BISC 12 Combined:** 500 points

**Please note that your TA has the option to adjust the points based on changes in the assignments; however the midterm and final values will remain the same.**

## Grading Policy:

While I expect the average grade for each section to be around a 'C', your instructor, if necessary, will normalize the average to 75%. For example, if you are in a "tough" section with an average of 60%, your instructor will add 15% to your grade. Note, that you cannot receive more than 100%. On the other hand, if you are in an "easy" section with an average of 90%, you will automatically lose 15% in order for us to determine your final grade. While these may be extreme examples, I want you to know that it pays to study hard no matter who your instructor is. Try to be ahead of the curve!

You can keep informed about your progress by checking your scores frequently on Blackboard. It is **your** responsibility to keep track of your scores and total points as Blackboard is prone to making calculating errors. You must inform your TA immediately if your records and Blackboard's do not match. If you want to contest missing points and other errors, please be advised to do this in a timely fashion, i.e. right during or immediately after the lab during which we returned a quiz, homework, etc. to you. Late complaints cannot be honored.

As your lab section is linked to the lecture, you will only receive a single grade for BISC 012. This grade will be posted on GWeb at the very end of the semester. For the grade cut-offs, consult the syllabus for the lecture part of this course.