

BSC 2010L - Integrated Principles of Biology I Laboratory Syllabus – Fall 2019

Course Information

Laboratory Locations: B-14 & B-20 Carr Hall and B-22 Bartram Hall

Biology Office: 220 Bartram Hall, 392-1175

Lab Coordinator: Kent A. Vliet, PhD, Department of Biology, 208 Carr Hall, 392-8130, kvliet@ufl.edu

Required Texts: (1) Vliet, K.A., 2020, *BSC 2010L: Integrated Principles of Biology I Lab Manual, Sixth Edition*. Macmillan Learning Curriculum Solutions, Plymouth, Michigan. 263 pp. – available from the Campus Welcome Center Bookstore.

(2) Hillis, D.M., Sadava, D., Heller, R.W., & Price M.V., 2014. *Principles of Life, 2nd Edition*, Sinauer Associates, Sunderland, Massachusetts. 952 pp.

CANVAS: <http://elearning.ufl.edu>

Homepage: www.bsc.ufl.edu/2010L.html

Your Instructor

Your BSC 2010L lab is taught by a Biology graduate teaching assistant. Record your TAs information in the spaces below and use this email address when communicating about the lab course.

My TA: _____
Office: _____
Office Hours: _____
Email: _____

Course Goals and Objectives

The primary goal of this course is to establish a coherent foundation of knowledge in biology and to prepare students for comprehension in advanced biology courses and science in general. Fundamental concepts discussed include the scientific methods by which we come to know things in science, the chemical composition and processes that make up all life, genetic processes and the means of inheritance of traits, the mechanisms and processes of natural selection, and adaptation and evolution of life on Earth. An additional course goal is to develop critical thinking skills for development of reasoned thought and for evaluation of life experiences.

Objectives of the course will be achieved if, by its conclusion, students can:

- Describe a scientific hypothesis and identify testable predictions that logically follow
- Construct proper figures representing biological data, and interpret data represented in similar figures
- Demonstrate the proper use and function of key types of laboratory equipment, such as microscopes, spectrophotometers, thermocyclers, and gel electrophoresis arrays
- Understand the importance of statistics in scientific sampling, determine appropriate statistical tests for particular types of data, understand the meaning of statistical significance, interpret statistic results and draw appropriate conclusions from them
- Describe the relationship between genotype and phenotype and identify methods by which genotype can be determined
- Determine the mode of inheritance of genetic traits based on ratios of phenotypes
- Identify the primary organs of representative invertebrates and their associated functions
- Discuss the evidence that all living things are descended from a common ancestor
- Read, evaluate, and construct a phylogenetic tree
- Practice safety and proper techniques in the laboratory
- Communicating scientific information effectively using oral presentations and written reports
- Relate a comprehensive knowledge of the diversity of animal clades

- Working collaboratively on group projects

General Education Objectives for Biological Sciences

Biological science courses provide instruction in the basic concepts, theories and terms of the scientific method in the context of the life sciences. Courses focus on major scientific developments and their impacts on society, science and the environment, and the relevant processes that govern biological systems. Students will formulate empirically-testable hypotheses derived from the study of living things, apply logical reasoning skills through scientific criticism and argument, and apply techniques of discovery and critical thinking to evaluate outcomes of experiments.

The General Education objectives and the associated Student Learning Outcomes for Biological Sciences are achieved through inquiry-based and active-learning exercises in the laboratory, including prelab assignments, experimental design, quizzes, oral presentations, and completion of weekly lab notes and data sheets. These exercises are designed to reinforce, augment, and accompany learning objectives in the companion BSC 2010 lecture course. In particular, the BSC 2010L lab exposes students to the development and testing of specific hypotheses, collection and presentation of biological data, and analysis of statistical significance.

General Education Student Learning Outcomes

The general education student learning outcomes (SLOs) describe the knowledge, skills and attitudes that students are expected to acquire while completing a general education course at the University of Florida. The SLOs fall into three categories: **content**, **communication** and **critical thinking**.

Every general education course must address all three SLOs. Note that the subject area objectives (detailed above) describe the context within which the SLOs are achieved.

| Category | Institutional Definition | Institutional SLO |
|--------------------------|---|---|
| CONTENT | Content is knowledge of the concepts, principles, terminology and methodologies used within the discipline. | Students demonstrate competence in the terminology, concepts, methodologies and theories used within the discipline. |
| COMMUNICATION | Communication is the development and expression of ideas in written and oral forms. | Students communicate knowledge, ideas, and reasoning clearly and effectively in written or oral forms appropriate to the discipline. |
| CRITICAL THINKING | Critical thinking is characterized by the comprehensive analysis of issues, ideas, and evidence before accepting or formulating an opinion or conclusion. | Students analyze information carefully and logically from multiple perspectives, using discipline specific methods, and develop reasoned solutions to problems. |

To assess student performance in meeting these student learning outcomes for this course, students are evaluated by a variety of instruments throughout the course: quizzes over units of laboratory exercises used to assess comprehension and reasoning, prelab assessments, weekly lab notes and datasheets emphasizing development of hypotheses, experimental design, collection of data, selection of proper statistics tests and interpretation of statistical results. The Communication SLO is assessed in graded written assessments and in oral presentations in the lab. Student Learning Outcomes are further assessed in BSC 2010, the companion lecture course. In combination, BSC 2010 and BSC 2010L provide assessments of all categories of the General Education Student Learning Outcomes.

Grading

Your BSC 2010L grade will be based on raw scores from quizzes, practical quizzes, lab sheets and pre- and post-lab assignments. Specific assignments are detailed in a point breakdown sheet provided with this syllabus. While data sheets, pre-labs, and post-labs are each worth a certain number of points, not all questions in every assignment may be graded. Rather, a subset of the questions may be graded for accuracy, while all others would be graded for completeness. Since you do not know which questions are graded for accuracy or completeness, you should devote full effort to all questions on assignments. Please understand that this policy has been implemented to reduce TAs' grading time while still offering students engaging learning experiences. Quizzes generally cover material from the previous lab exercise as well as assigned readings for the present lab. Final letter grades will be assigned based on percentage of the total points earned. Minimum grade cutoffs are listed below. These may be lowered ("curved") at the discretion of the instructors, but they will not be raised. In other words, if you receive 90% of the possible points, you are guaranteed to earn an A grade.

| Point Range (%) | Letter Grade |
|-----------------|--------------|
| ≥ 90.0 | A |
| ≥ 86.7 | A- |
| ≥ 83.3 | B+ |
| ≥ 80.0 | B |
| ≥ 76.7 | B- |
| ≥ 73.3 | C+ |
| ≥ 70.0 | C |
| ≥ 66.7 | C- |
| ≥ 63.3 | D+ |
| ≥ 60.0 | D |
| ≥ 56.7 | D- |
| < 56.7 | E |

Note that the current UF policy for assigning grade points is available at the following undergraduate catalog web page: <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>.

Extra Credit: There is no extra credit available in this course.

Special Treatment: Please do not request individual special treatment regarding grading at the end of the semester; **we do not adjust grades for individuals for any reason.** Plan to do well on all exams and other assessments from the beginning of the semester; if you are having difficulty in the class, please let your instructors know *before* the exams rather than after.

Material and Supplies Fee

There is a Materials and Supplies Fee of \$13.78 associated with this course. In addition, there is an Equipment fee charge of \$30.00 associated with the course.

Lab Supplies

Dissecting kit (small probe and seeker, fine dissecting scissors, fine point forceps, scalpel with replaceable blade, teasing needles). The Campus Shop, the Florida Bookstore, and University Book and Supply should carry good kits with these items. **All of these supplies must be furnished by the student.** They will not be available in lab.

Reading Assignments

You should review fully each laboratory assignment *prior* to the laboratory period. In most cases you will be unable to complete the observations and experiments fully and efficiently during the lab period unless you know exactly what is to be done before you walk into the laboratory. Reading assignments are included in this syllabus. Weekly quizzes are based partially on the reading assignments.

Expectations

Each student is solely responsible for reading and following the instructions, guidelines and schedules in this syllabus. Not having read the information in this syllabus will not constitute an excuse for missing an assignment, exam or other assessment.

Attendance

Policies on class attendance, make-up assignments, and excused absences are detailed below. Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found in the online catalog at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>.

Lab Policies

Excused absences

You are expected to attend the lab section for which you are registered. If you miss your lab, notify your instructor immediately by e-mail. You must have a **valid, documented excuse** for missing your regular lab section to be allowed to make up a lab without penalty. **The validity of excuses for missed labs or assignments will be determined by your instructor.** If you do not have documentation for missing your lab, you *may be* given the opportunity to make up assignments of graded materials **at the discretion of your instructor.** This work will be done outside of the laboratory and will be penalized 20% of the total points. In this case, missed quizzes cannot be made up. *Missed labs generally must be made up within the same week.* **If you know in advance that you are unable to make your regular sections, contact your lab TA earlier in the week.**

Illness

If you are ill with an infection that may be contagious by casual contact (e.g., a cold or flu), you should not attend class. Furthermore, if you have a fever associated with any illness, you should not attend class until you have been free of fever for at least 24 hours. The instructor reserves the right to ask any student to leave the classroom at any time if there is a reasonable likelihood that the student's presence in the classroom places other students at substantial risk of infection.

Assignment deadlines

Graded assignments are due at the *beginning* of the lab session one week after the actual lab work was done, unless otherwise noted. Assignments turned in after the start of the lab session will be considered late work. NOTE: Students who attend a lab session other than their officially registered section and perform an experiment which require a data sheet or lab report *must still turn in their work at the beginning of their officially registered section on the following week.* If you are unable to turn in your work during your regular

lab section and are not able to hand it in directly to your instructor, DO NOT leave an assignment at your instructor's office. Rather, (1) make a photocopy of your lab report for safekeeping and (2) hand in the original to the staff of the departmental office (**220 Bartram Hall**) during regular office hours (**8 a.m.- 4 p.m.**).

Late work

Late work will be penalized 10% of the total points per day (weekends, *i.e.*, Friday to Monday, are counted as two days and U.F.-recognized holidays are not counted). NOTE: The weekends preceding and following the Semester Break holidays will be counted.

Participation

Students may be allowed to turn in assignments on which they did not participate in the collection of data, *at the discretion of the lab instructor*. These assignments will be penalized 20% of points.

Lab cleanliness

No food or drink is permitted in the labs and students are expected to leave the lab as clean and orderly as it was when they arrived for class. NOTE: All scraps of paper, paper towels, broken cover slips and slides, masking tape, and any other trash must be properly disposed of by the students themselves.

Lab attire

Students are not allowed to wear sandals or open-toed shoes in the laboratories.

Accommodations for Students with Disabilities

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter, which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Counseling and Wellness Center

Many students experience test anxiety and other stress related problems. The University's Counseling and Wellness Center (<http://www.counseling.ufl.edu/cwc/Default.aspx>, 392-1575) offers a diverse array of support systems. In an emergency, students should contact the University Police Department: 392-1111 or 9-1-1.

U Matter, We Care

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Online Course Evaluations

Students are expected to provide feedback on the quality of instruction in this course based on 10 criteria. These evaluations are conducted online at <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results>.

Academic Honesty

All UF students are bound by The Honor Pledge which states:

"We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code." On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied."

In addition, on all work submitted for credit the following pledge is either required or implied:

"On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (<http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

BSC 2010L Laboratory Schedule – Fall 2019

Laboratory topics and reading assignments for this course are listed below. This is a tentative schedule; the dates and coverage of specific topics are subject to change.

| Week | Week of | Laboratory Topic | Assignments |
|------|---------|---|---|
| 1 | 19 Aug | **** NO LABS **** | Statistics Pre-lab |
| 2 | 26 Aug | Introduction; Science and Statistical Inference | <ol style="list-style-type: none"> 1. Read Chapters 1 and 2 2. Statistics Pre-lab (10 pt) 3. Cricket Chirp Activity (5 pt) Statistics Lab Notes (15 pt) |
| 3 | 2 Sept | **** NO LABS **** | |
| 4 | 9 Sept | Enzyme Kinetics Diversity: Phyla Porifera, Cnidaria (Chapter 13) QUIZ 1 | <ol style="list-style-type: none"> 1. Read Chapters 4, 5 and 12 2. Enzymes Pre-lab (10 pt) 3. Quiz 1 (10 pt) 4. Enzymes Lab Notes (15 pt) |
| 5 | 16 Sept | Yeast Fermentation Diversity: Phyla Platyhelminthes, Annelida and Nematoda (Chapter 13 continued), QUIZ 2 | <ol style="list-style-type: none"> 1. Enzymes Postlab (5 pt) 2. Read Chapter 6 3. Quiz 2 (10 pt) 4. Yeast Fermentation Lab Notes (5 pt) |
| 6 | 23 Sept | Enzymes & Fermentation Inquiry Diversity: Phylum Mollusca (Chapter 14) QUIZ 3 | <ol style="list-style-type: none"> 1. Read Chapter 7 2. Enzymes & Fermentation Pre-lab (10 pt) 3. Quiz 3 (10 pt) 5. Enzymes & Fermentation Lab Notes (15 pt) |
| 7 | 30 Sept | **** NO LABS **** | |
| 8 | 7 Oct | Experimental Genetics 1 Diversity: Phylum Arthropoda (Chapter 14 continued) QUIZ 4 | <ol style="list-style-type: none"> 1. Read Chapters 8 & 9 2. Experimental Genetics 1 Pre-lab (10 pt) 3. Quiz 4 (10 pt) 4. Experimental Genetics 1 Lab Notes (15 pt) |
| 9 | 14 Oct | PTC PCR Diversity: Phylum Echinodermata (Chapter 16), QUIZ 5 | <ol style="list-style-type: none"> 1. Read Chapter 11 2. Quiz 5 (10 pt) 3. PTC PCR Lab Notes - answer questions 1 and 2 |

| | | | |
|-----------|--------|---|--|
| 10 | 21 Oct | Experimental Genetics 2 Diversity: Phylum Chordata: Subphyla Urochordata and Cephalochordata (Chapter 16) QUIZ 6 | <ol style="list-style-type: none"> 1. Review Chapter 9 2. Quiz 6 (10 pt) 3. Experimental Genetics 2 Lab Notes (10 pt) |
| 11 | 28 Oct | Population Genetics Diversity: Phylum Chordata: Subphylum Craniata: 6 classes of fishes (2 groups) (Chapter 16 continued), QUIZ 7 | <ol style="list-style-type: none"> 1. Review Chapter 11 2. Quiz 7 (10 pt) 3. PTC PCR Lab Notes - answer remaining questions (5 pt) 4. Population Genetics Lab Notes (15 pt) |
| 12 | 4 Nov | Invertebrate Dissections Diversity: Phylum Chordata, Subphylum Craniata: Amphibians, Reptiles (including Birds), Mammals (2 groups) (Chapter 16 continued). QUIZ 8 | <ol style="list-style-type: none"> 1. Read Chapter 15 2. Invertebrate Dissections Pre-lab (5 pt) 3. Quiz 8 (10 pt) 4. Invertebrate Dissections Lab Notes (15 pt) |
| 13 | 11 Nov | **** NO LABS **** | |
| 14 | 18 Nov | Cladistics QUIZ 9 | <ol style="list-style-type: none"> 1. Read Chapter 17 2. Cladistics Pre-lab (15pt) 3. Quiz 9 (20 pt) 4. Cladistics Lab Notes (10 pt) |
| 15 | 25 Nov | **** NO LABS **** | |
| 16 | 2 Dec | **** NO LABS **** | |

BSC 2010L Laboratory Assignment and Point Breakdown Sheet – Fall 2019

| WEEK | ASSIGNMENTS | POINTS |
|------|---|---------------------------|
| 1 | **** NO LABS **** Statistics Pre-lab (Chapter 2) | |
| 2 | Statistics Pre-lab (Chapter 2) Cricket Chirp Activity Statistics Lab Notes | ___/10 ___/5 ___/15 |
| 3 | **** NO LABS **** | |
| 4 | Enzymes Prelab Enzymes Lab Notes | ___/10 ___/15 |
| 5 | Enzymes Postlab Yeast Fermentation Lab Notes | ___/5 ___/5 |
| 6 | Enzymes & Fermentation Prelab Enzymes & Fermentation Lab Notes | ___/10 ___/15 |
| 7 | **** NO LABS **** | |
| 8 | Experimental Genetics 1 Prelab Experimental Genetics 1 Lab Notes | ___/10 ___/15 |
| 9 | PTC PCR Lab Notes | ___/5 |
| 10 | Experimental Genetics 2 Lab Notes | ___/10 |
| 11 | Population Genetics Lab Notes | ___/15 |
| 12 | Invertebrate Dissection Prelab Invertebrate Dissection Lab Notes | ___/5 ___/15 |
| 13 | **** NO LABS **** | |
| 14 | Cladistics Prelab Cladistics Lab Notes | ___/15 ___/10 |
| 15 | **** NO LABS **** | |
| 16 | **** NO LABS **** | |
| | Quizzes: 1. _____/10, 2. _____/10, 3. _____/10, 4. _____/10, 5. _____/10, 6. _____/10, 7. _____/10, 8. _____/10, 9. _____/20. | ___/100 |
| | Diversity Presentation (PowerPoint) | ___/10 |
| | TOTAL POINTS: | ___/300 |

BSC Laboratory Safety

Work in the Biology laboratory may expose students to **inherently dangerous activities**. Students in the BSC laboratories may be exposed to chemicals (e.g., formaldehyde, organic solvents, acids, and other caustic chemicals), chemical fumes, laboratory equipment and supplies (e.g., scalpels, razor blades, glass slides, coverslips, and electrical equipment), toxic or irritating properties of living and dead animals, and other materials necessary to laboratory activities. Other possible hazards include broken glass on the floor or counters, combustible materials, and slippery spills.

1. Smoking, eating, and drinking are expressly forbidden and NOT allowed in the laboratory.
2. Locate the placement of safety equipment and supplies in the laboratory: safety shower, eye wash station, fire extinguisher, and first aid kit. Memorize these locations. You should understand the use of this equipment. Also note the locations of exits. Each laboratory has a chemical exposure manual. These include material safety data sheets on all hazardous chemicals or compounds to which you might be exposed in the BSC laboratory.
3. Students should follow instructions carefully, especially when hazardous conditions occur or hazardous materials are being used.
4. Students should dress appropriately in the lab. Gloves and protective aprons will be made available in the labs. Students may elect to supply their own gloves and protective aprons or laboratory coats. Only shoes that provide complete foot covering are allowed in the lab.
5. You should be familiar with fire procedures. Leave the building immediately should a major fire occur or if the fire alarm sounds. Notify the appropriate authorities -- don't assume someone else remembered to do it. Meet with other students and your instructor outside the building before leaving so that an accurate headcount may be made.
6. The safe use of specific equipment and tools (e.g., microscopes, slides, scalpels, and pipettes) will be demonstrated by the instructor during the laboratory sessions. Be sure you understand this usage and ask questions if you do not.
7. Never pipette by mouth. Always use a suction bulb or pipette aid.
8. Notify your T.A. IMMEDIATELY of any spills, breakages, or equipment malfunction.
9. Students should report all hazardous conditions to the instructor immediately.
10. All organisms, living or dead, should be treated with care and respect. Avoid direct handling when possible.
11. Students should clean up any supplies used and should return materials where they belong as instructed. Any material spilled should be cleaned appropriately. Report any hazardous spills or breakages.
12. Broken glass and sharp metal waste should be placed only in those receptacles marked for such disposal -- do not put these materials in normal trash receptacles.
13. Work areas must be left clean and dry prior to leaving the lab. Chemicals and reagents must be returned to their proper places.
14. You should always wash your hands before leaving the laboratory, even if you have not knowingly come in contact with any chemicals or biological fluids.