

BSC 2010L - Integrated Principles of Biology I Laboratory Syllabus – Spring 2015

Course Information

Laboratory Locations: B-14 & B-20 Carr Hall, 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., 2013. *BSC 2010L: Integrated Principles of Biology I Lab Manual, Fourth Edition*. Hayden-McNeil Publishing, Plymouth, Michigan. 248 pp.

(2) Vliet, K.A. BSC 2010L Course Pack - available at Target Copy.

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

CANVAS: <https://lss.at.ufl.edu/>

Instructor

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
- Understand 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 statistical 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

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.

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.

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.

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>.

BSC 2010L Laboratory Schedule – Spring 2015

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	6 Jan	**** NO LABS ****	Science and Statistical Inference Pre-lab
2	12 Jan	Introduction; Science and Statistical Inference	<ol style="list-style-type: none"> 1. Read pp. v-vi and Chapters 1 and 2 in manual, Science and Statistical Inference in course pack 2. Statistics Pre-lab (10 pt) 3. Cricket Chirp Activity (5 pt) 4. Statistics Lab Notes (15 pt)
3	19 Jan	**** NO LABS ****	
4	26 Jan	Enzyme Kinetics Diversity: Phyla Calcarea, Silicea (Porifera), Cnidaria	<ol style="list-style-type: none"> 1. Read Chapters 5, 6 and 7 in manual, Enzyme Kinetics in course pack. 2. Enzymes Pre-lab (10 pt) 3. Enzymes Lab Notes (15 pt)
5	2 Feb	Yeast Fermentation Diversity: Phyla Platyhelminthes, Annelida and Nematoda	<ol style="list-style-type: none"> 1. Enzymes Postlab (5 pt) 2. Read Chapter 10 in manual 3. Fermentation Lab Notes (5 pt)
6	9 Feb	Enzymes & Fermentation Inquiry Diversity: Phylum Mollusca QUIZ 1	<ol style="list-style-type: none"> 1. Quiz 1 (15 pt) 2. Enzymes & Fermentation Pre-lab (10 pt) 3. Enzymes & Fermentation Lab Notes (25 pt)
7	16 Feb	Introduction to Genetics Diversity: Phylum Arthropoda	<ol style="list-style-type: none"> 1. Read Chapter 11 in manual, Introduction to Genetics in course pack. 2. Genetics Lab Notes (15 pt)
8	23 Feb	Experimental Genetics 1 Diversity: Phylum Echinodermata	<ol style="list-style-type: none"> 1. Read Chapter 12 in manual 2. Experimental Genetics 1 Pre-lab (10 pt) 3. Experimental Genetics 1 Lab Notes (15 pt) 4. Deuterostomes chapter in course pack
9	2 Mar	**** NO LABS ****	
10	9 Mar	Experimental Genetics 2 Diversity: Phylum Chordata: Subphyla Urochordata and Cephalochordata QUIZ 2	<ol style="list-style-type: none"> 1. Quiz 2 (25 pt) 2. Experimental Genetics 2 Lab Notes (10 pt)
11	16 Mar	PTC PCR - Amplification Diversity: Phylum Chordata: Subphylum Craniata: 1 st 3 classes of fishes	<ol style="list-style-type: none"> 1. Read PTC PCR and Population Genetics in course pack 2. PTC PCR Lab Notes - answer questions 1 and 2 (5 pt)

12	23 Mar	PTC PCR - Restriction Digest Diversity: Phylum Chordata: Subphylum Craniata: 2 nd 3 classes of fishes	<ol style="list-style-type: none"> 1. Read Chapter 16 in manual and Population Genetics in course pack 2. PTC PCR Lab Notes - answer remaining questions (5 pt)
13	30 Mar	Population Genetics Diversity: Phylum Chordata, Subphylum Craniata: Amphibians, Reptiles (including Birds) QUIZ 3	<ol style="list-style-type: none"> 1. Review Chapter 16 2. Quiz 3 (15 pt) 3. Population Genetics Lab Notes (15 pt)
14	6 Apr	Invertebrate Dissections Diversity (2 groups): Phylum Chordata, Subphylum Craniata: Mammals	<ol style="list-style-type: none"> 1. Read Chapters 18 and 20 in manual 2. Invertebrate Dissections Pre-lab (5 pt) 3. Invertebrate Dissections Lab Notes (15 pt)
15	13 Apr	Cladistics QUIZ 4	<ol style="list-style-type: none"> 1. Read Cladistics in course pack 2. Cladistics Pre-lab (15pt) 3. Quiz 4 (15 pt) 4. Cladistics Lab Notes (10 pt)
16	20 Apr	**** NO LABS ****	

BSC 2010L Laboratory Assignment and Point Breakdown Sheet – Spring 2015

WEEK	ASSIGNMENTS	POINTS
1	**** NO LABS ****	
2	Science and Statistical Inference Prelab Cricket Chirp Activity Science and Statistical Inference Lab Notes	___/10 ___/5 ___/15
3	**** NO LABS ****	
4	Enzyme Kinetics Prelab Enzyme Kinetics Lab Notes	___/10 ___/15
5	Enzymes Postlab Yeast Fermentation Lab Notes	___/5 ___/5
6	Enzymes & Fermentation Prelab Quiz 1 (Statistics, Enzyme Kinetics, Fermentation, diversity) Enzymes & Fermentation Lab Notes	___/10 ___/25 ___/15
7	Introduction to Genetics Notes	___/15
8	Experimental Genetics 1 Prelab Experimental Genetics 1 Lab Notes	___/10 ___/15
9	**** NO LABS ****	
10	Quiz 2 (Enzymes & Fermentation, Intro to Genetics, Experimental Genetics, diversity) Experimental Genetics 2 Lab Notes	___/25 ___/10
11	PTC PCR Lab Notes (questions 1-2)	___/5
12	PTC PCR Lab Notes (complete)	
13	Quiz 3 (PTC, PCR, Population Genetics, Diversity) Population Genetics Lab Notes	___/15 ___/15
14	Invertebrate Dissection Prelab Invertebrate Dissection Lab Notes	___/5 ___/15
15	Cladistics Prelab Quiz 4 (Population Genetics, Invert Dissections, Cladistics, Diversity) Cladistics Lab Notes	___/15 ___/15 ___/10
	Diversity Presentation (PowerPoint)	___/10
TOTAL POINTS:		___/295

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.