

BSC 2005L – Laboratory in Biological Sciences Syllabus – Spring 2022

Course Information

Laboratory Location: B-14 and B-20 Carr Hall

Biology Office: 220 Bartram Hall, 392-1175

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

Online Office Hours: Wednesdays 9:30-11:30am and by appointment - <https://ufl.zoom.us/j/4336756706>

Required Text: Vliet, K.A., 2019. *BSC 2005L: Laboratory in Biological Sciences Laboratory Manual, 1st*

Edition. Macmillan Learning Curriculum Solutions, Plymouth, Michigan. 174 pp. ISBN 978-5339-1000-4.

Available from the Campus Welcome Center Bookstore.

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

Instructor

My TA: _____

Office: _____

Office Hours: _____

Email: _____

Pre(Co)Requisite

BSC 2005 – Biological Sciences. Officially, BSC 2005 is a pre- or co-requisite for BSC 2005L. However, any biology course, including high school biology, and access to a biology text will probably be adequate.

Course Description

This is not a laboratory course in the traditional sense of the word. Few actual investigations will be conducted. However, we will provide evidence and understanding of biological principles through a variety of visual and multimedia approaches, allowing an interactive approach to the understanding of aspects of biology.

The amazing intricacies and complexities of life tend to obscure basic underlying relationships among all living things. This course attempts to elucidate principles of biological organization and function that tie together seemingly unrelated forms. The tendency of species to change over time (*i.e.*, evolution) will provide the basis of our approach to interpreting biological phenomena. Biological principles will be examined at all levels, from cellular, to organs and whole organisms, and to ecosystems. Attention will be paid to the relationships between structure (anatomy) and function (physiology) at all levels of organization. The course includes a study of human body structures and functions. Several lab exercises emphasize biological processes using humans as models. Ecological problems related to human impact on the environment will also be discussed.

University Policies and Resources

We will have face-to-face instructional sessions to accomplish the student learning objectives of this course. In response to COVID-19, the following policies and requirements are in place to maintain your learning environment and to enhance the safety of our in-classroom interactions.

- You are required to wear approved face coverings at all times during class and within buildings. Following and enforcing these policies and requirements are all of our responsibility. Failure to do so will lead to a report to the Office of Student Conduct and Conflict Resolution.

- This course has been assigned a physical classroom with enough capacity to maintain physical distancing (6 feet between individuals) requirements. Please utilize designated seats and maintain appropriate spacing between students. Please do not move desks or stations.
- Sanitizing supplies are available in the classroom if you wish to wipe down your desks prior to sitting down and at the end of the class.
- Follow your instructor's guidance on how to enter and exit the classroom. Practice physical distancing to the extent possible when entering and exiting the classroom.
- If you are experiencing COVID-19 symptoms ([Click here for guidance from the CDC on symptoms of coronavirus](#)), please use the UF Health screening system and follow the instructions on whether you are able to attend class. [Click here for UF Health guidance on what to do if you have been exposed to or are experiencing Covid-19 symptoms.](#)

Course materials will be provided to you with an excused absence, and you will be given a reasonable amount of time to make up work. [Find more information in the university attendance policies.](#)

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 the process by which science is conducted
- Understand the origins, structure and functions of cells
- Be able to describe the process of cell division, including both meiosis and mitosis
- Explain how random changes in DNA may arise and how natural processes may cause the proportion of genes in a population to change over time, including the evolution of new species
- Discuss the evidence that all living things are descended from a common ancestor
- Describe the relationship between genotype and phenotype and identify methods by which genotype can be determined
- Identify the primary organs of humans and their associated functions
- Define sexual reproduction and explain the general reproductive life cycle of animals
- Recognize native ecosystems and understand the threats non-native invasive species pose to them
- Learnedly debate the impact of human activities on the environment.

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, moderated discussions and debates, and completion of weekly lab notes and data sheets. These exercises are designed to reinforce and clarify concepts and learning objectives, with an emphasis on making an understanding of biology relevant to daily life.

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. The Communication SLO is assessed in graded written assessments, moderated discussions and debates, and in oral presentations in the lab. Student Learning Outcomes are further assessed through directed readings and associated discussions.

Grading

Your BSC 2005L grade will be based on raw scores from quizzes, worksheets, data sheets and lab exercises. Specific assignments are detailed in a point breakdown sheet provided with this syllabus. Quizzes generally cover material from the previous lab exercise as well as assigned readings for the present lab. Final letter grade 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.

| Letter Grade | Point Range (%) |
|--------------|-----------------|
| A | $\geq 93.0\%$ |
| A- | $\geq 90.0\%$ |
| B+ | $\geq 87.0\%$ |
| B | $\geq 83.0\%$ |
| B- | $\geq 80.0\%$ |
| C+ | $\geq 77.0\%$ |
| C | $\geq 73.0\%$ |
| C- | $\geq 70.0\%$ |
| D+ | $\geq 67.0\%$ |
| D | $\geq 63.0\%$ |
| D- | $\geq 60.0\%$ |
| E | < 60% |

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 \$1.61 associated with this course. In addition, there is an Equipment fee charge of \$22.45 associated with the course.

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

A. 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 makeup assignments of graded materials **at the discretion of your instructor.** This work will be penalized 20% of the total points. *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.**

B. 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.

C. 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.**).

D. 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.

E. 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 the points.

F. 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.

G. 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 2005L Laboratory Schedule – Spring 2022

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 Items indicated in bold print are to be read before lab. |
|-----------|---------|--|--|
| 1 | 5 Jan | **** NO LABS **** | |
| 2 | 10 Jan | Introduction/ Scientific Method | 1. Reading: Scientific Method– Chapter 1 2. Reading: Microscopes – Chapter 2 3. <i>Homework</i> : Telling Truth from Fiction |
| 3 | 16 Jan | **** NO LABS **** | |
| 4 | 24 Jan | Cells | Reading: Cells– Chapter 3 1. Lab: Cheek & Hydrilla Cells 2. <i>Homework</i> : Complete Cells Datasheet |
| 5 | 31 Jan | DNA | 1. Reading – Chapters 4 & 5 2. Lab: DNA Extraction 3. <i>Homework</i> : Complete DNA Extraction Datasheet Read Article #1 Article #1 Worksheet Study for Quiz #1 |
| 6 | 7 Feb | Inheritance Quiz #1 | 1. Reading – Chapters 6 & 7 2. Quiz #1 3. Discussion: Article #1 (Student led discussion) 4. Lab: Human Traits (Datasheet due by the end of class) |
| 7 | 14 Feb | Microevolution | 1. Reading – Chapter 9 2. Lab: Differential Reproduction & Survival Exercise 3. <i>Homework</i> : Complete Datasheet Article #2 Article #2 Worksheet |
| 8 | 21 Feb | Macroevolution | 1. Reading – Chapter 9 (cont.) 2. Discussion: Article #2 (Student led discussion) 3. Lab: Skull Lab and Museum Scavenger Hunt 4. <i>Homework</i> : Complete Skull Datasheet Study for Quiz #2 |
| 9 | 28 Feb | Human Anatomy Quiz #2 | 1. Reading – Chapter 14 2. Lab: Human Anatomy 3. Complete Anatomy Datasheet 4. Homework: Read Article #4 Worksheet #4 |
| 10 | 7 Mar | SPRING BREAK – NO CLASSES | |
| 11 | 14 Mar | Sexual Reproduction | 1. Reading – Chapter 15 2. Lab: Sexual Reproduction 3. Discussion: Article #4 (Student led discussion) 4. Complete the Urogenital Datasheet 5. Homework: Complete Reproduction Postlab |

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|-----------|--------|---|--|
| 12 | 21 Mar | Sensory Physiology | <ol style="list-style-type: none"> 1. Reading – Chapter 16 2. Lab: Sensory Physiology 3. Complete Physiology Datasheet 4. <i>Quiz #3</i> 2. Homework: Native vs. Exotic Plant Prelab |
| 13 | 28 Mar | Ecology & Florida's Ecosystems | <ol style="list-style-type: none"> 1. Reading – Chapters 10 & 11 2. Lab: Invasive vs. Native Species Identification 3. <i>Homework:</i> Complete Native vs. Exotic Datasheet Read Article #3 Worksheet #3 Human Impacts Group Assignment Study for Quiz #3 |
| 14 | 4 Apr | Human Impact Quiz #3 | <ol style="list-style-type: none"> 1. Reading – Chapter 13 2. Discussion: Article #3 (Student led discussion) 3. Human Impacts Discussion 4. Quiz #3 |
| 15 | 11 Apr | **** NO LABS **** | |
| 16 | 18 Apr | **** NO LABS **** | |

BSC 2005L Laboratory Assignment and Point Breakdown Sheet – Spring 2022

| WEEK | ASSIGNMENTS | POINTS |
|-----------|---|---------------|
| 1 | **** NO LABS **** | |
| 2 | Telling Truth from Fiction in Online Sources | 15 |
| 3 | **** NO LABS **** | |
| 4 | Cells Datasheet | 15 |
| 5 | DNA Extraction Datasheet Article #1 Worksheet | 15 5 |
| 6 | Quiz 1 Human Traits Datasheet | 15 15 |
| 7 | Differential Reproduction and Survival Exercise Datasheet Article #2 Worksheet | 15 5 |
| 8 | Skull Adaptation Datasheet Museum Scavenger Hunt Datasheet (due in Sexual Reproduction lab) | 10 5 |
| 9 | Quiz 2 Anatomy Datasheet | 15 10 |
| 10 | **** NO LABS **** | |
| 11 | Urogenital Datasheet Article #4 Worksheet | 10 5 |
| 12 | Sensory Physiology | 15 |
| 13 | Native vs. Exotic Plant Species Datasheet Article #3 Worksheet | 10 5 |
| 14 | Human Impacts Group Assignment Human Impacts Discussion Participation Quiz 3 | 10 5 20 |
| 15 | **** NO LABS **** | |
| | Science Article and Presentation Science Articles Discussion | 10 5 |
| | TOTAL POINTS: | /235 |

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.