

BSC 2005L – Laboratory in Biological Sciences Syllabus – Spring 2023

Course Information

Laboratory Location: 315 Rolfs 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

Your BSC 2005L lab is taught by a Biology graduate teaching assistant. Record your TA's contact information and office hours in the spaces below and use this email address when communicating about the lab course.

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.

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	Students demonstrate competence in the terminology, concepts, methodologies and theories

the discipline.

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.

A minimum grade of C is required for general education credit.

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	≥ 93.0%
A-	≥ 90.0%
B+	≥ 87.0%
B	≥ 83.0%
B-	≥ 80.0%
C+	≥ 77.0%
C	≥ 73.0%
C-	≥ 70.0%

Letter Grade	Point Range (%)
D+	≥ 67.0%
D	≥ 63.0%
D-	≥ 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/UGRD/academic-regulations/grades-grading-policies/>.

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 \$1.25 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/UGRD/academic-regulations/attendance-policies/>.

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 who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center. [Click here to get started with the Disability Resource Center.](#) It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Campus Resources

Health and Wellness

U Matter, We Care: If you or someone you know is in distress, please contact umatter@ufl.edu , 352-392-1575, or visit [U Matter, We Care website](#) to refer or report a concern and a team member will reach out to the student in distress.

Counseling and Wellness Center: [Visit the Counseling and Wellness Center website](#) or call 352-392-1575 for information on crisis services as well as non-crisis services.

Student Health Care Center: Call 352-392-1161 for 24/7 information to help you find the care you need, or [visit the Student Health Care Center website](#).

University Police Department: [Visit UF Police Department website](#) or call 352-392-1111 (or 9-1-1 for emergencies).

UF Health Shands Emergency Room / Trauma Center: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; [Visit the UF Health Emergency Room and Trauma Center website](#).

GatorWell Health Promotion Services: For prevention services focused on optimal wellbeing, including Wellness Coaching for Academic Success, visit the [GatorWell website](#) or call 352-273-4450.

Academic Resources

E-learning technical support: Contact the [UF Computing Help Desk](#) at 352-392-4357 or via e-mail at helpdesk@ufl.edu.

Career Connections Center: Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling services.

Library Support: Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center: Broward Hall, 352-392-2010 or to make an appointment 352- 392-6420. General study skills and tutoring.

Writing Studio: 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing papers.

Student Complaints On-Campus: [Visit the Student Honor Code and Student Conduct Code webpage for more information](#).

On-Line Students Complaints: [View the Distance Learning Student Complaint Process](#).

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 2023

Laboratory topics and reading assignments for this course are listed below. This is the expected schedule; the dates and coverage of specific topics are subject to change. A summary of each topic and the point values assigned to each assignment are provided below this table.

Week	Week of	Laboratory Topic	Assignments Items indicated in bold print are to be read before lab.
1	9 Jan	**** NO LABS ****	
2	16 Jan	**** NO LABS ****	
3	23 Jan	Introduction/ Scientific Method	1. Reading: Scientific Method– Chapter 1 2. Reading: Microscopes – Chapter 2 3. <i>Homework</i> : Telling Truth from Fiction
4	30 Jan	Cells	1. Reading: Cells– Chapter 3 2. Lab: Cheek & Hydrilla Cells 3. <i>Homework</i> : Complete Cells Datasheet
5	6 Feb	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	13 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	20 Feb	Microevolution	1. Reading – Chapter 9 2. Lab: Differential Reproduction & Survival Exercise 3. <i>Homework</i> : Complete Datasheet Article #2 Article #2 Worksheet
8	27 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	6 Mar	Human Anatomy Quiz #2	1. Reading – Chapter 14 2. Lab: Human Anatomy 3. Complete Anatomy Datasheet 4. <i>Homework</i> : Read Article #4 Worksheet #4
10	13 Mar	SPRING BREAK – NO CLASSES	
11	20 Mar	Sexual	1. Reading – Chapter 15

		Reproduction	<ul style="list-style-type: none"> 2. Lab: Sexual Reproduction 3. Discussion: Article #4 (Student led discussion) 4. Complete the Urogenital Datasheet
12	27Mar	Sensory Physiology	<ul style="list-style-type: none"> 1. Reading – Chapter 16 2. Lab: Sensory Physiology 3. Complete Physiology Datasheet 4. Homework: Native vs. Exotic Plant Prelab
13	3 Apr	Ecology & Florida's Ecosystems	<ul 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	10 Apr	Human Impact Quiz #3	<ul style="list-style-type: none"> 1. Reading – Chapter 13 2. Discussion: Article #3 (Student led discussion) 3. Human Impacts Discussion 4. Quiz #3
15	17 Apr	**** NO LABS ****	
16	24 Apr	**** NO LABS ****	

BSC 2005L Laboratory Assignment and Point Breakdown Sheet – Spring 2023

WEEK	ASSIGNMENTS	POINTS
1	**** NO LABS ****	
2	**** NO LABS ****	
3	Scientific Method: Introduce students to the scientific method and facilitate the development of their critical thinking skills through the use of scenarios, discussion, and exercises Telling Truth from Fiction in Online Sources	____ 15
4	Cells: Examine basic aspects of cell structure and function, including the most relevant organelles, emphasizing prokaryotic and eukaryotic cells, similarities and differences between bacterial, plant and animal cells Cells Datasheet	____ 15
5	DNA: What DNA is and what it does, genetically modified organisms, DNA replication, genes and chromosomes, mitosis, students extract DNA from a frozen strawberry so they can see it and feel it DNA Extraction Datasheet Article #1 Worksheet	____ 15 ____ 5
6	Inheritance: Students review concepts of crosses, generations, dominance and recessiveness, genotype and phenotype, basic Mendelian inheritance, Punnett Squares; students study single gene genetic traits in themselves Quiz 1 Human Traits Datasheet	____ 15 ____ 15
7	Microevolution: Processes resulting in change over time, natural selection, hands-on exercises in differential reproduction and survival Differential Reproduction and Survival Exercise Datasheet Article #2 Worksheet	____ 15 ____ 5
8	Macroevolution: Mechanisms involved in the formation of new species and higher taxa, student-led class discussion of creation and evolution, students examine numerous examples of mammal skulls to understand function and adaptation, students must complete an out of class exercise visiting the fossil hall at the Florida Museum of Natural History Skull Adaptation Datasheet Museum Scavenger Hunt Datasheet (due in Sexual Reproduction lab)	____ 10 ____ 5
9	Human Anatomy: Students examine dissected fetal pigs to learn the structure and function of organs, organ systems, and hormone cycles facilitating their understanding of their own anatomy, common diseases associated with each system are highlighted to reinforce organ functions Quiz 2 Anatomy Datasheet	____ 15 ____ 10
10	**** NO LABS ****	
11	Sexual Reproduction: Investigation of the structures involved in reproduction and their functions, exercise emphasizing the potential spread of HIV, further examination of dissected fetal pigs, consideration of methods of contraception and how each interferes with the natural reproductive process Urogenital Datasheet Article #4 Worksheet	____ 10 ____ 5
12	Sensory Physiology: Students use various instruments to investigate senses of the eye, ear, mechanoreception, reflexes, and reaction time Sensory Physiology	____ 15
13	Ecology & Florida's Ecosystems: Study of the many ecosystems found in Florida and the plants and animals that typify them, discussion of trophic levels and food webs; in	____ 10

	a field trip on campus, students use a dichotomous key to identify woody plant species and identify which are native and which are introduced Native vs. Exotic Plant Species Datasheet Article #3 Worksheet	5
14	Human Impact: Students learn about many ways in which humans negatively impact our environment; in a student-led debate, students play the role of various stakeholders and discuss the impact of global climate change Human Impact Group Assignment Human Impact Discussion Participation Quiz 3	10 5 20
15	**** NO LABS ****	
	Science Article: Throughout the semester, students select scientific articles of interest to them, break them down into the basic questions being addressed, materials and methods, results and conclusions, and then present their summaries to the class with a short PowerPoint 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.