

## **BIOL 102: CONCEPTS AND APPLICATIONS IN BIOLOGY II**

Spring 2017 – Section 4 (CRN 20118)

MWF 1:30-2:20 pm, HWW 217

**PROFESSOR:** Dr. Ashley Lavender

**EMAIL:** [lavenderal@cofc.edu](mailto:lavenderal@cofc.edu)\*

**PHONE:** (843) 953-4986

**OFFICE:** 65 Coming Street, Room 101

**OFFICE HOURS:** MW 10:30-11:30 am and by appointment

\*best contact method

### **COURSE OVERVIEW**

This is a non-science majors' course, which will provide a background for understanding and evaluating contemporary topics in biology and societal/environmental issues. The course emphasizes physiology and anatomy of organisms, ecological and evolutionary concepts, biodiversity, and conservation biology. An understanding of methods, history, and the dynamic nature of science will also be emphasized.

### **Prerequisite**

BIOL 101

### **Co-requisite**

You **MUST** enroll in the lab section (BIOL 102L) in addition to this lecture.

### **COURSE MATERIALS**

#### **Required**

- *Biology: Concepts and Applications* by C. Starr et al., 9<sup>th</sup> edition  
You must have access to this textbook! You can buy it, rent it, get the ebook, borrow it, or share it with a classmate. Read the required textbook chapter(s) *before* lecture. Use the text and figures to review and reinforce lecture material. There are self-quizzes that can be helpful study guides, as well as a variety of web links to help you understand the material. There is a lot of material to cover in this course, so keep up with the reading!
- Basic scientific calculator (exponents and square roots)
- # 2 pencil(s) for exams

#### **Provided**

Announcements, assignments, grades, lectures, required readings (in addition to the textbook), and this syllabus will be available online on OAKS. You can access OAKS via [MyCharleston](#) or directly via the [OAKS Portal](#). In most cases, lecture slides will be posted to OAKS *after* the lecture. To supplement material presented in class, I may post narrated slides on VoiceThread, which may also be accessed through OAKS. **No study guides will be provided.** Check OAKS and your CofC email on a frequent basis for important course information.

### **TEACHING PHILOSOPHY**

I encourage participation and interaction in my lectures and will do my best to create an engaging and inclusive learning environment. However, it is not all up to me. I depend on you, the student, to also take an active role in your education (after all, you pay to be here!) by being mentally and physically present during class.

## **COURSE POLICIES & REQUIREMENTS**

### **Class Attendance**

You are expected to attend **all** meetings of the class. Students are responsible for getting their own notes from a classmate for any class missed. Exams will be based almost entirely on lectures. In addition to reading the textbook in preparation for lecture, I encourage you to consult this helpful reference when preparing for all assessments. **You will not do well in this course if you miss lectures.** Also, missed pop quizzes CANNOT be made up. Some assignments will require group work during lecture to complete. This material is challenging and requires work on your part for success!

### **Technology Use Policy**

No cell phones, computers, iPads or similar electronic devices are permitted in lecture without my authorization. If such devices are used without my consent, you may be asked to leave. On occasion, I will ask that you bring personal electronic devices to class to aid in course-related task completion.

### **Honor Code & Academic Integrity**

Students are required to adhere to the guidelines outlined by the Honor Board. All work in the course is done under the College of Charleston Honor Code. When specified, assignments and projects may be completed as a group. **Assignments for this course must be your original work and completed for this course only.** Note that handing in previously graded work is in clear violation of the College of Charleston Honor Code. Suspected Honor Code infractions will be reported to the Dean's Office and will result in a "0" for the assignment in question. Any form of plagiarism (intentional and unintentional), cheating, or presenting someone else's work as one's own will be treated as a serious academic transgression and will be communicated accordingly by the instructor as an honor code violation to the Division of Student Affairs. Be especially cautious of plagiarism when using Internet sources. **Cheating, attempted cheating, or plagiarism will result in a grade of zero on that assignment or exam and may result in a final overall grade of "F" or "XXF" (failure due to academic dishonesty) for the course.**

"Lying, cheating, attempted cheating, and plagiarism are violations of our Honor Code that, when identified, are investigated. Each incident will be examined to determine the degree of deception involved.

Incidents where the instructor determines the student's actions are related more to a misunderstanding will be handled by the instructor. A written intervention designed to help prevent the student from repeating the error will be given to the student. The intervention, submitted by form and signed both by the instructor and the student, will be forwarded to the Dean of Students and placed in the student's file.

Cases of suspected academic dishonesty will be reported directly by the instructor and/or others having knowledge of the incident to the Dean of Students. A student found responsible by the Honor Board for academic dishonesty will receive a XXF in the course, indicating failure of the course due to academic dishonesty. This grade will appear on the student's transcript for two years after which the student may petition for the XX to be expunged. The F is permanent. The student may also be placed on disciplinary probation, suspended (temporary removal) or expelled (permanent removal) from the College by the Honor Board.

Students should be aware that unauthorized collaboration--working together without permission-- is a form of cheating. Unless the instructor specifies that students can work together on an assignment, quiz and/or test, no collaboration during the completion of the assignment is permitted. Other forms of cheating include

possessing or using an unauthorized study aid (which could include accessing information via a cell phone or computer), copying from others' exams, fabricating data, and giving unauthorized assistance. Research conducted and/or papers written for other classes cannot be used in whole or in part for any assignment in this class without obtaining prior permission from the instructor. Students can find the complete Honor Code and all related processes in the [Student Handbook](#)."

### **Late Policy**

- The due dates for all assignments will be posted on OAKS. Failure to complete an assignment by the posted deadline will result in the final assignment grade being reduced by 10% for each day it is past the deadline. **Electronic and in-person submissions after 4 p.m. count as the next day.** You have a maximum of 2 days to submit the work to be assessed. After 2 days, your grade will be recorded as a "0."
- **Save and backup your work often!** A computer malfunction is not an approved excuse for submitting work past the deadline.
- No assignments will be accepted after the graded assignments have been returned.

### **Email Policy**

Typically, I check my CofC email account Monday-Friday (when the College is open) until 5 pm and respond to messages within two business days. If you need to discuss an urgent matter with me, I suggest reaching me by phone and/or sending an email with "URGENT" in the subject line. Please address me as "Dr. Lavender" or "Prof. Lavender" in written correspondence.

## **ASSESSMENTS**

### **Assignments (10%)**

Three homework assignments will be assigned during the semester and are intended to reinforce material covered in class and to encourage critical thinking. They will require you to seek information from sources outside of class. **Do not rely on the possibility of extra credit offerings.** All students are expected to turn in their assignments (which are to be done independently, unless otherwise stated) by the beginning of the class period on the date scheduled. If hard copies are requested, only typed and stapled documents will be accepted. Hold onto all graded materials until the final grade for the course has been posted.

### **Group Project (5%)**

To complete the course, students will work in small groups to design a sustainability-oriented social media campaign. Each group will construct a meme and launch a campaign to raise awareness about sustainability on the College of Charleston's campus. Each group will present their projects at the end of the semester.

### **Quizzes (15%)**

Quizzes will be given throughout the semester, either in class or on OAKS. They are intended to assist students in keeping up with the large amount of information in this course. **No make-up quizzes are given, but your lowest non-zero quiz score will be dropped.** A missed quiz will result in a "0" for that quiz, unless the student provides a valid and documented absence memo (through the Absence Memo Office; see below). Acceptable excuses include serious illness, personal tragedy or extreme circumstances beyond the student's control. If you have a quiz excused, all of your remaining quiz scores will count toward your final grade (None will be dropped.). No more than 2 quizzes may be excused. All cell phones, pagers, iPods, iPads, tablets, laptops, etc. are to be powered down and put away during each quiz. If handwritten notes are permitted during a quiz, you will be notified. You are expected to take each quiz without the aid of a classmate.

## Exams (70%)

In this course, there are **4** exams scheduled during lecture, and **1** cumulative final exam scheduled during the final examination period. You will need to bring a #2 pencil with you to exams. **There will be no make-up exams.** Any student who misses an exam will receive a "0," unless the student provides a valid and documented absence memo (through the [Absence Memo Office](#), 67 George St.) for missing a scheduled exam. Acceptable excuses include serious illness, personal tragedy or extreme circumstances beyond the student's control. If you have any conflicts with the scheduled exams, you must see me **two weeks in advance** of the exam date. Any scheduling conflict outside your role at the College (e.g., vacation) is not an acceptable reason for missing an exam. After receiving one excused exam, a student will be in danger of receiving a grade of "Incomplete" for the course if any more exams are missed. All cell phones, pagers, PDAs, iPods, laptops, etc. are to be powered down and put away during each exam.

[Kahoot!](#), [Poll Everywhere](#), and other interactive learning platforms may be used to encourage in-class participation and to serve as informal assessment tools. Click on these links to learn more. To participate, you must be in class!

## GRADING

Your final lecture grade will be weighted. Use the formula below to calculate your **final lecture grade**:  
[(Assign. avg.)\*0.10]+[(Group project)\*.05]+[(Quiz avg.)\*0.15]+[(Exam avg.)\*0.55]+[(Final exam score)\*0.15]

Note: The lecture and lab sections form a single course. **Final grade = lecture grade (75%) + lab grade (25%)**

Letter grades will be determined by the following breakdown:

### Grading Scale

<b>A</b>	≥ 93%
<b>A-</b>	90-92%
<b>B+</b>	87-89%
<b>B</b>	83-86%
<b>B-</b>	80-82%
<b>C+</b>	77-79%
<b>C</b>	73-76%
<b>C-</b>	70-72%
<b>D+</b>	67-69%
<b>D</b>	63-66%
<b>D-</b>	60-62%
<b>F</b>	≤ 59%
<b>XXF</b>	0% due to academic dishonesty

## **EXPECTATIONS OF THE STUDENTS**

- 1.) **TURN OFF** all cell phones, pagers, iPods, iPads, tablets, laptops and anything with alarms before coming into my class **AND PUT THEM AWAY**. If you forget to do so you may be asked to leave and not to return that class period. If you have a legitimate need to use a laptop, please see me to discuss.
- 2.) **DO NOT TALK OR TEXT**. Your phone should be off and put away in lecture. Please be courteous and pay attention! If you have a question, please ask me.
- 3.) It will take me some time to learn your names. I can see everyone, even in such a large lecture hall, so please be punctual, stay awake, participate and be attentive.

## **STUDENT RESOURCES**

### **Accommodation**

SNAP students, athletes, international, ESL, and all students with life circumstances that may warrant accommodations are encouraged to discuss any concerns with me in a timely manner.

### **Center for Student Learning**

I encourage you to utilize the Center for Student Learning's (CSL) academic support services for assistance in study strategies, speaking & writing strategies, and course content. CSL offers tutoring, Supplemental Instruction, study strategy appointments, and workshops. Students of all abilities have become more successful using these programs throughout their academic career, and the services are available to you at no additional cost.

For more information regarding these services, please visit the [CSL website](#) or call: (843) 953-5635.

### **Center for Disability Services (SNAP)**

The College will make reasonable accommodations for persons with documented disabilities. Students should apply for services at the Center for Disability Services/SNAP located on the first floor of the Lightsey Center, Suite 104. Students approved for accommodations are responsible for notifying me as soon as possible. A one-week lead time is required for accommodations. Click [here](#) for additional information about SNAP.

## BIOL 102-04 SCHEDULE^

<u>Week</u>	<u>Date</u>	<u>Lecture Topic(s)</u>	<u>Chapter(s)</u>
<b>1</b>	Jan. 11 (W)	Welcome to BIOL 102!	
	<b>Natural Selection, Evolution, &amp; Life's Origin</b>		
	<b>Jan. 13 (F)</b>	Natural Selection, Evolution, & Speciation <b>Syllabus Quiz (OAKS)</b>	16, 17
<b>2</b>	Jan. 16 (M)	<b>NO CLASS</b> (Martin Luther King Jr. Day)	
	Jan. 18 (W)	Natural Selection, Evolution, & Speciation <i>Last day to Add/Drop!</i>	16, 17
	Jan. 20 (F)	Natural Selection, Evolution, & Speciation	16, 17
<b>3</b>	Jan. 23 (M)	Natural Selection, Evolution, & Speciation	16, 17
	<b>Jan. 25 (W)</b>	Natural Selection, Evolution, & Speciation <b>Assignment 1 Due</b>	16, 17
	Jan. 27 (F)	Life's Origin, Early Evolution, & Prokaryotes	18
<b>4</b>	Jan. 30 (M)	Life's Origin, Early Evolution, & Prokaryotes	18
	<b>Feb. 1 (W)</b>	<b>EXAM #1</b>	
	Feb. 3 (F)	Viruses & Microbes	19, 20
<b>5</b>	Feb. 6 (M)	Viruses & Microbes (cont.) and Fungi	19, 20, 22
	<b>Plant Biology</b>		
	Feb. 8 (W)	Plant Biology	26, 27
	Feb. 10 (F)	Plant Biology	26, 27
<b>6</b>	Feb. 13 (M)	Plant Biology	26, 27
	<b>Feb. 15 (W)</b>	<b>EXAM #2</b> <i>Optional Event (7-9 pm)*: <a href="#">Blue Mind: Water for Your Wellbeing, Presentation &amp; Book Signing</a> by Dr. Wallace J. Nichols (Holland Lifelong Learning Event; host: SC Aquarium; location: Davies Auditorium at Ashley Hall, 172 Rutledge Ave.)</i>	
	<b>Animal Evolution, Diversity, &amp; Organ Systems (I)</b>		
	Feb. 17 (F)	Animal Diversity	23, 24
<b>7</b>	Feb. 20 (M)	Animal Evolution	24, 28
	Feb. 22 (W)	Animals: Cells, Tissues, & Organ Systems	28
	Feb. 24 (F)	Animals: Nervous System	29
<b>8</b>	Feb. 27 (M)	Animals: Skeletomuscular System	32
	Mar. 1 (W)	Animals: Circulatory System	33
	<b>Mar. 3 (F)</b>	<b>EXAM #3</b>	
<b>Spring Break</b>			
<b>9</b>	Mar. 6 (M)	<b>NO CLASS!</b>	
	Mar. 8 (W)	<b>NO CLASS!</b>	
	Mar. 10 (F)	<b>NO CLASS!</b>	
<b>Animal Organ Systems (II)</b>			
<b>10</b>	Mar. 13 (M)	Animals: Respiratory System	35
	Mar. 15 (W)	Animals: Endocrine System <i>Midterm grades will be available on MyCharleston tomorrow!</i>	31
	Mar. 17 (F)	Animals: Immune System	34

11	Mar. 20 (M)	Animals: Digestive System & Human Nutrition	36
	Mar. 22 (W)	Animals: Homeostasis & Urinary (Renal) System <i>Last day to withdraw with a grade of "W" is tomorrow!</i>	37
	<b>Mar. 24 (F)</b>	Animals: Reproduction & Development <b>Assignment 2 Due</b>	38
<b><u>Animal Sensory Systems &amp; Behavior</u></b>			
12	Mar. 27 (M)	Animals: Sensory Perception	30
	Mar. 29 (W)	Animal Behavior ( <b>NO CLASS</b> ; online lecture) <i>Optional Events*:</i> <i>(1) 03/29/17 (2-4 pm): Morris Island Anecdota Plastics Workshop (for Citizen Scientists)</i> <i>(2) 03/30/17 (8 am-5 pm): <a href="#">Breaking Down Plastic</a>, SC Aquarium 2017 Plastic Pollution Summit; location: Charleston Gaillard Center</i>	39
	Mar. 31 (F)	<b>EXAM #4</b>	
<b><u>Ecology &amp; Sustainability</u></b>			
13	Apr. 3 (M)	Human Effects on the Biosphere & Group Project Intro.	44
	Apr. 5 (W)	<i>Racing Extinction</i> (2015) – Part 1	
	Apr. 7 (F)	<i>Racing Extinction</i> (2015) – Part 2 & Class Discussion	
14	Apr. 10 (M)	Guest Lecture: Designing & Monitoring Social Media Campaigns <b>Assignment 3 Due</b> <b>Launch Date of Social Media Campaign</b>	
	Apr. 12 (W)	The Biosphere	43
	Apr. 14 (F)	Ecosystems	42
15	Apr. 17 (M)	Community Ecology	41
	Apr. 19 (W)	Population Ecology	40
	Apr. 21 (F)	Biomimicry <i>Tomorrow is Earth Day!</i>	
16	Apr. 24 (M)	Review <b>Last Day of Sustainability Social Media Campaign</b>	
	Apr. 26 (W)	<b>Group Presentations:</b> Sustainability Social Media Campaign <i>Last day of this course!</i>	
	May 5 (F)	<b><u>CUMULATIVE FINAL EXAM (HWW 217)</u></b> Note: The Ecology & Sustainability Module material will be emphasized.	

**Notes:**

^ The above schedule is subject to change. Schedule departures will be announced in lecture and on OAKS.

\* Funding opportunities may be available for these and other community events. Please express your interest in attending the ones listed above via email by **Wednesday, Feb. 1<sup>st</sup>**.

Final examinations **must** be taken at the time scheduled, **except** when:

- 1.) Two or more exams are scheduled *simultaneously*.
- 2.) Legitimate **AND** documentable extenuating circumstances prevent the student from completing the examination at the scheduled time (e.g., burial services for an immediate family member) *Note: Forms for permission to reschedule one exam may be obtained from the Office of the Registrar Forms on the Academic Services tab on MyCharleston. Written permission of the instructor and all relevant signatures must be obtained at least 24 hours prior to the scheduled time for the final examination.*

## **ADDENDUM: GENERAL EDUCATION INFORMATION**

### **CONCEPTS AND APPLICATIONS IN BIOLOGY I & II: BIOL 101/101L & BIOL 102/102L**

**Department: Biology**

#### **Learning Goals & Objectives**

This general education science course provides a background for understanding and evaluating contemporary topics in biology and societal/environmental issues. Students develop a general understanding of core concepts and develop the critical competencies that form the bases for the practice of science and use of scientific knowledge.

#### **Core Concepts**

This 2-semester course sequence in general biology addresses fundamental principles in biology which broadly include:

- **Evolution:** The diversity of life evolved over time by processes of mutation, selection, and genetic change. The theory of evolution by natural selection allows scientists to understand patterns, processes, and relationships that characterize the diversity of life.
- **Structure and Function:** Basic units of structure define the function of all living things. Structural complexity, together with the information it provides, is built upon combinations of subunits that drive increasingly diverse and dynamic physiological responses in living organisms. Fundamental structural units and molecular and cellular processes are conserved through evolution and yield the extraordinary diversity of biological systems seen today.
- **Information flow, exchange and storage:** The growth and behavior of organisms are activated through the expression of genetic information at different levels of biological organization and depend on specific interactions and information transfer.
- **Pathways and transformation of energy and matter:** Biological systems grow and change by processes based upon chemical transformation pathways and are governed by the laws of thermodynamic and will be explored to understand how living systems operate, how they maintain orderly structure and function, and how physical and chemical processes underlie processes at the cellular level (i.e., metabolic pathways, membrane dynamics), organismal level (i.e., homeostasis) and ecosystem level (i.e., nutrient cycling).
- **Biological systems:** Living systems are interconnected and interacting and biological phenomena are the result of emergent properties at all levels of organization, from molecules to ecosystems to social systems. The course will explore the dynamic interactions of components at one level of biological organization to the functional properties that emerge at higher organizational levels.

These ideas are explored from the perspective of the following topics in each course:

#### **BIOL 101 & 101L**

- Chemical and Physical Properties of Life
- Evolution as a unifying principle in biology
- Cell Form & Function
- Energetics and Metabolism
- The Cell Cycle
  - Meiosis and Sexual Reproduction
  - Mitosis and Cell Reproduction



- Mendelian Genetics
- Patterns of Inherited Traits
- Human Inheritance
- The Molecular Basis of Inheritance
- DNA and protein production
- Regulation of gene expression
- Biotechnology

## **BIOL 102 & 102 L**

- Evolutionary Processes
- Origins of Life
- Biodiversity
  - Viruses, Bacteria and Archaeans
  - "Protist" Lineages
  - Plants
  - Fungi
  - Animals
- Plant Form & Function
- Animal Form & Function
- Principles of Ecology

## **Core Competencies**

- **Nature of scientific knowledge**
  - Understand the intellectual standards used by scientists to establish the validity of knowledge, evidence, and decisions about hypothesis & theory acceptance? These standards include: 1) science relies on external and naturalistic observations, and not internal convictions. 2) scientific knowledge is based on the outcome of the testing of hypotheses and theories that are under constant scrutiny and subject to revision based on new observations 3) the validity of scientifically generated knowledge is established by the community of scientists through peer review and open publication of work.
  - Understand that new ideas in science are limited by the context in which they are conceived; are often rejected by the scientific establishment; sometimes spring from unexpected findings; and usually grow slowly, through contributions from many investigators.
  - Understand that science operates in the real world as defined by the laws of chemistry and physics.
  - Understand the differences between and relations among a scientific theory, hypothesis, fact, law, & opinion.
  - Understand the differences between science and technology but also their interrelations.
  - Understand the dynamic (tentative) nature of science.
- **Scientific methods of discovery**
  - <sup>1</sup>Understand the methods scientists use to understand the natural world (observing; questioning; formulating testable deductive hypotheses; controlled experimentation when possible; observing a wide range of natural occurrences and discerning (inducing) patterns.)
  - Apply physical/natural principles to analyze and solve problems.
- **Developing a scientific attitude**
  - Develop habits of mind that foster interdisciplinary and integrative thinking (within biology; between biology and other sciences; between science and other disciplines)
  - Develop an appreciation for the scientific attitude - a basic curiosity about nature and how it works.

- **Develop scientific analysis and communication skills**
  - Develop quantitative reasoning skills (quantitatively expressing the results of scientific investigations, or patterns in nature and using knowledge of biological concepts to explain quantitatively-expressed data or patterns).
  - Understand the probabilistic nature of science and the use/application of inferential statistics to test hypotheses.
  - Develop scientific information literacy (library, internet, databases etc.); finding and evaluating the validity of science-related information.
  - Communicate scientific knowledge, arguments, ideas in a variety of different contexts (scientific, social, cultural) and utilizing a variety of different media (scientific articles, policy statements, editorials, oral presentations etc.).
  - Develop cooperative problem-solving skills (working effectively in teams), but also habits of mind and skills that foster autonomous learning.
  
- **Develop an appreciation for the impact of science on society**
  - Develop an appreciation of humans as a part of the biosphere and the <sup>2</sup>impact of biological science on contemporary societal/environmental concerns.
  - Knowledge of the history of the biological sciences and the influences of politics, culture, religion, race, and gender on the scientific endeavor.

### **Signature Assignments for Measuring Learning Outcomes**

#### **Learning Outcome #1: Students apply physical/natural principles to analyze and solve problems.**

This learning outcome is assessed using the poster (or scientific article) generated in Biology 102 lab as part of the multi-week student-directed independent research project. In this project students use ecological data they collect (or which has been collected in actual research investigations) to test an ecological hypothesis of their choosing. This multi-week project begins with students becoming experts in various areas of ecological sampling.

Students, working in small research teams, decide on a question they would like to explore. Teams then develop a research proposal to test their hypothesis. Students collect (or use already collected data), summarize and analyze the data, and draw conclusions.

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<sup>1</sup>This learning goal is measured as part of the general education assessment. The specific learning outcome to be measured is: *Students apply physical/natural principles to analyze and solve problems.* <sup>2</sup>This learning goal is measured as part of the general education assessment. The specific learning outcome to be measured is: *Students demonstrate an understanding of the impact that science has on society.*

#### **Learning Outcome #2: Students demonstrate an understanding of the impact that science has on society.**

BIOL 102 lab students produce a written document (e.g., policy statement, article, stake-holder professional letter or poster) which requires them to research and apply biological knowledge or evidence to defend or critique a proposed solution to a biology-related societal issue. Although the choice of the specific issue or proposed solution is course-section specific, some examples of potential issues include:

- exploring environmental/health impacts of genetically modified organisms
- the epidemic of diabetes in the United States
- solutions for mitigating global climate change