Biology 112: Evolution, Form and Function of Organisms  
Section 3 | TR 5:30-6:45 PM | SSMB 203

Course Syllabus Update | Spring 2023 March 14-April 28

Instructor: Deb Bidwell  
Supplemental Instruction Leader: Gray Blackstone  
Email: bidwelld@cofc.edu | Office: RITA 209

Course Description

- A foundation course for science majors introducing evolution with an emphasis on the structure, form and function of plants and animals. Students will be exposed to lectures, activities, readings, discussions, and assessment to ensure a thorough, lasting understanding of the material. Completion of this class and the associated laboratory meets a General Education requirement. For details please see the addendum at the end of this syllabus.

Pre-requisites

- Successful completion of Biology/Honors 111/151, or a high grade in Biology 101. Biology 112 laboratory is normally a co-requisite, unless students already have credit for the laboratory portion of the course.

Student Learning Objectives

- This general education science sequence provides a background for understanding and evaluating contemporary topics in biology. Students develop a foundational understanding of core concepts to use and on which to expand in upper level courses. They also develop the critical competencies that form the bases for the practice of science and use of scientific knowledge. (see addendum for more information)

Contact/Communication

Private/Student-To-Instructor Contact

- Students should contact me about issues that are specific to the student by email at bidwelld@cofc.edu
- My response time with emails will be within 24 hours on weekdays and within 48 hours on weekends.

General Student-To-Instructor and Student-To-Student Contact

- Students should contact the Instructor and other students on issues that are not student-specific and may benefit or apply to the entire class using the Discussion Board Hallway Conversations open 24 hours a day, 7 days a week. This forum is designed to answer one another’s questions speedily.
- My response turnaround time on the hallway conversations discussion board will be
within 48 hours, but students typically answer one another’s questions more quickly.  

Office Hours  
● In person office hours (drop-in, group, no waiting) in RITA 209 are Tuesdays 4:00-5:00 PM and/or by appointment/Zoom (arrange by email bidwelld@cofc.edu).

Supplemental Instruction  
● This class utilizes Supplemental Instruction (SI) with Gray Blackstone. Students are strongly encouraged to attend SI once a week.

Course Communication and Community Building  
● OAKS, including Gradebook, will be used for this course throughout the semester to provide the syllabus and class materials and grades for each assignment, which will be regularly posted.  
  
  New to Oaks? Get up to speed fast with tutorials here:  
  https://blogs.cofc.edu/sits/tutorials/oaks_tutorials/  
● Email will be used to communicate important or sudden changes in course information.  
● We will all work together to build our classroom learning community. We all belong. I will play a facilitating role in helping you get to know, work with, trust, and collaborate with the other members of our class. Each member of the class must be willing to participate in a dynamic, and engaging learning group that is inclusive. Your participation, willingness to contribute, and your initiative are paramount to having a successful and enjoyable learning experience.

Expectations  
● Students should plan to log into Oaks at least 2 times per week.  
● Students should take advantage of supplemental instruction once a week.  
● Students should dedicate 6+ hours per week to this course to thrive.  
● This class is student-driven. Motivation must come from the student.  
● Our class should be interactive and engaging!  
● Students are expected to contribute to our learning community.  
● There are typically weekly obligations: quizzes or exams.  
● Research clearly indicates that note taking by hand is a superior method of learning.  
● Please keep phones silenced and away during our class time.

Required Course Materials  
● Computer/technology with access to internet  
● Software/Apps: (OAKS, Google Drive, Microsoft Office, Voicethread)  
● Free Textbook: https://openstax.org/details/books/biology-2e  
● Pencil(s) on exam days  
● Basic scientific calculator (exponents & square roots)
Participation

- There is no official attendance requirement for lecture, but students who miss class do not succeed.

Accommodation

The Center for Disability Services/SNAP is committed to assisting qualified students with disabilities achieve their academic goals by providing reasonable academic accommodations under appropriate circumstances. If you have a disability and anticipate the need for an accommodation in order to participate in this class, please connect with the Center for Disability Services/SNAP. They will assist you in getting the resources you may need to participate fully in this class. You can contact the Center for Disability Services/SNAP office at 843.953.1431 or at snap@cofc.edu. You can find additional information and request academic accommodations at the Center for Disability Services/SNAP website.

SNAP students, Athletes, International, ESL, and all students with life circumstances that may warrant accommodations are encouraged to provide paperwork and discuss any concerns with the Instructor in a timely manner. I am fluent in Spanish. I understand that we all have way more important things going on in our lives than this biology class. I aim to be friendly, approachable, and understanding. I will also hold you to high standards.

Honor Code and Academic Integrity

As members of the College of Charleston community, we affirm, embrace and hold ourselves accountable to the core values of integrity, academic excellence, liberal arts education, respect for the individual student, diversity, equity and inclusion, student centeredness, innovation and public mission. Congruent with these core values, the College of Charleston expects that every student and community member has a responsibility to uphold the standards of the honor code, as outlined in the Student Handbook. In pursuit of academic learning, you are expected to reference the work of other scholars, and complete your own academic work, while utilizing appropriate resources for assistance. Any acts of suspected academic dishonesty will be reported to the Office of the Dean of Students and addressed through the conduct process. Your adherence to these practices and expectations plays a vital role in fostering a campus culture that balances trust and the pursuit of knowledge while producing a strong foundation of academic excellence at the College of Charleston. Any questions regarding these expectations can be clarified by your instructor.

Weather, Pandemic or Interruption of Instruction

If in-person classes are suspended, faculty will announce to their students a detailed plan for a change in modality to ensure the continuity of learning. All students must have access to a computer equipped with a web camera, microphone, and Internet access. Resources are available to provide students with these essential tools.

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. They offer 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 at http://csl.cofc.edu/ or call (843)953-5635.
Land and Labor Acknowledgement
We are located on the traditional lands of the first people of Charleston: the Etiwan, Kiawah, Edisto Natchez Kusso, Santee, and Wassamassaw people (also known as Varner Town Indians). We acknowledge and honor all indigenous people who lived, labored and were faithful stewards of the land. We express our deep gratitude for the land and continued faithful stewardship to the next generations.

We also acknowledge the lives and labor of the Africans who were enslaved to build Charleston, South Carolina. On this campus and in this space, African and African-descended people used skilled labor in ornamental ironwork, historic architecture, and low country agriculture and food production. As a member of the College of Charleston community, I acknowledge the Black lives and labor that built our city and our campus.

Diversity and Inclusion in the classroom
I am committed to creating an inclusive and accessible classroom environment for all students. I view the diversity that students bring to this class as a resource, strength, and benefit. It is my intent to present materials and activities that are respectful of diversity: gender, sexuality, disability, generational status, socioeconomic status, ethnicity, race, religious background, and immigration status. Any suggestions for promoting a positive and open environment will be appreciated and given serious consideration.

I will gladly honor your request to address you by the name and gender pronouns of your choice. Please advise me of this early in the semester via your college-issued email account or during office hours so that I may make the appropriate notation on my class list.

Inclusion
The [Multicultural Student Programs and Services](#) provides a haven for students to develop connections with other students. It exists to help students be successful, provide advocacy, support services, and culturally based programs that educate about diversity and multiculturalism and empower them to be agents of social change in an increasingly diverse and global community.

The College of Charleston offers many resources for LGBTQ+ students, faculty, and staff along with their allies.

**Preferred Name and Pronoun Information**
**On Campus Gender Inclusive facilities**
**Campus Resources**
**College of Charleston Reporting Portals**
**National Resources for Faculty & Staff**
**GSEC Reports**
**Documenting LGBTQ Life in the Lowcountry (CofC Addlestone Library Special Collections Project)**
**College of Charleston Quality Enhancement Plan (QEP)**
**Articles about CofC and LGBTQ+ Issues**

In keeping with the College of Charleston’s core values of diversity, equity and inclusion, the Cougar Inclusion Team (CIT) provides education, information, and recommendations regarding support resources to members of the campus community who have experienced exclusion or bias. The CIT works to support members of our campus community who report concerns by listening, discussing resources, providing guidance on resolution options, conducting education, and collecting information about occurrences on our campus. A report to the CIT team helps us better understand our campus climate, informs our educational and infrastructure opportunities to address concerns that are shared, and fosters an environment where everyone feels welcome. More information about the CIT, including how to report an exclusion or bias incident can be found here: [Purpose - College of Charleston (cofc.edu)](#)
Mental & Physical Wellbeing
We take every student’s mental and physical wellbeing seriously. If you find yourself experiencing physical illnesses, please reach out to student health services (843.953.5520). And if you find yourself experiencing any mental health challenges (for example, anxiety, depression, stressful life events, sleep deprivation, and/or loneliness/homesickness) please consider contacting either the Counseling Center (professional counselors at CofC Counseling Center or 843.953.5640 3rd Floor of Robert Scott Small Building) or the Students 4 Support (certified volunteers through texting "4support" to 839863, or meet with them in person 411 (4th Floor) Stern Center). Learn more about Students 4 Support on CofC’s Hub. These services are there for you to help you cope with difficulties you may be experiencing and to maintain optimal physical and mental health.

Food & Housing Resources
Many CofC students report experiencing food and housing insecurity. If you are facing challenges in securing food (such as not being able to afford groceries or get sufficient food to eat every day) and housing (such as lacking a safe and stable place to live), please contact the Dean of Students for support (SALT - Student Affairs Leadership Team). Also, you can go to Student Food and Housing Insecurity to learn about food and housing assistance that is available to you. In addition, there are several resources on and off campus to help. You can visit the Cougar Pantry in the Stern Center (2nd floor), a student-run food pantry that provides dry-goods and hygiene products at no charge to any student in need. Please also consider reaching out to Professor ABC if you are comfortable in doing so.

Religious Accommodation
The College of Charleston community is enriched by students of many faiths that have various religious observances, practices, and beliefs. We value student rights and freedoms, including the right of each student to adhere to individual systems of religion. The College prohibits discrimination against any student because of such student's religious belief or any absence thereof.

The College acknowledges that religious practices differ from tradition to tradition and that the demands of religious observances in some traditions may cause conflicts with student schedules. In affirming this diversity, like many other colleges and universities, the College supports the concept of “reasonable accommodation for religious observance” in regard to class attendance, and the scheduling of examinations and other academic work requirements, unless the accommodation would create an undue hardship on the College. Faculty are required, as part of their responsibility to students and the College, to ascribe to this policy and to ensure its fair and full implementation.

The accommodation request imposes responsibilities and obligations on both the individual requesting the accommodation and the College. Faculty members are expected to reasonably accommodate individual religious practices. Examples of reasonable accommodations for student absences might include: rescheduling of an exam or giving a make-up exam for the student in question; altering the time of a student’s presentation; allowing extra-credit assignments to substitute for missed class work or arranging for an increased flexibility in assignment dates. Regardless of any accommodation that may be granted, students are responsible for satisfying all academic objectives, requirements and prerequisites as defined by the instructor and by the College.
Assessment

- **Quizzes** will be multiple-choice, individual, timed, randomized, approximately 15 questions, and conducted through OAKS. They are open-book and open-notes, but students must prepare ahead of time, as quizzes are challenging and there will not be time to look up individual answers. Failing to complete a quiz within the 5-day open period results in a zero. Note that religious accommodation for quiz during Passover can be arranged if necessary.

- **Exams** will be in-class multiple-choice exams. Extra credit will be based on readings found in OAKS. If you are truly too injured or ill to take an exam, you will likely be in the hospital or receiving urgent medical attention. If you need to miss an exam due to an official CofC activity, please plan well ahead of time. Other valid excuses may be documented weddings or funerals. Documentation must be provided for any early/make up exam to be approved. Missing an exam without Instructor approval results in a zero.

- The **final exam** is cumulative, multiple choice, and held during the scheduled final exam time on Friday April 28 from 6 - 8 PM in our (new) regular classroom.

Grades calculated as follows:

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<thead>
<tr>
<th>Component</th>
<th>Value (% of final course grade)</th>
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<tbody>
<tr>
<td>Quizzes (9 of 11) lowest two scores dropped</td>
<td>30</td>
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<td>Exams (3 of 4) lowest score replaced by final if final exam score is higher</td>
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<td>Cumulative Final Exam</td>
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<td>Total:</td>
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<th>Final course average:</th>
<th>Grade</th>
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<td>100-93</td>
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<td>Week</td>
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<td>Mar 13-17</td>
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<td>Animals – neuromuscular junction</td>
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<td>Mar 20-24</td>
<td>Animals - endocrine system</td>
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<td>Animals - cardiovascular system</td>
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<td>Animals - respiratory system</td>
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<td>Animals – endocrine system</td>
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<td>Mar 27-31</td>
<td>Animals - cardiovascular system</td>
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<td>Animals - respiratory system</td>
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<td>Apr 3-7</td>
<td>Animals - osmoregulation/urinary system</td>
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<td>Animals – reproductive system</td>
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<td>Apr 10-14</td>
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<td>Apr 17-21</td>
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<td>Apr 24-27</td>
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Tentative Schedule for Bidwell sp 2023 BIOL 112-03:
Addendum: General Education information:

Introduction to Cell and Molecular Biology/Evolution, Form, and Function of Organisms
BIOL 111 & 111L/BIOL 112 & 112L
Department: Biology

Learning Goals & Objectives

This general education science sequence provides a background for understanding and evaluating contemporary topics in biology. Students develop a foundational understanding of core concepts to use and on which to expand in upper level courses. They also 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 to prepare students for sophomore and upper level courses in biology:

- **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 TRANSFORMATIONS 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).

- **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.

The specific topics covered in each course include:

**Biology 111 & Biology 111L**
- Chemical and physical properties of life
- Cell form & function
- Energetics, metabolism, and photosynthesis
- The cell cycle
  - Mitosis and cell reproduction
  - Meiosis and sexual reproduction
- Mendelian genetics / Patterns of inheritance
- Human Inheritance
- The molecular basis of inheritance
- DNA and protein production
- Regulation of gene expression
- Some aspects of biotechnology

**Biology 112 & Biol 112 L**
- The development of evolutionary thinking
- Basic evolutionary processes
- Comparative plant form & function
• Comparative animal form & function

Core Competencies

• Nature of Scientific Knowledge
  o 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 testing of hypotheses and theories, which 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.
  o 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.
  o Understand that science operates in a world defined by the laws of chemistry and physics.
  o Understand the differences and relationships among scientific theories, hypotheses, facts, laws, & opinions.
  o Understand the differences between science and technology, but also their interrelations.
  o Understand the dynamic (tentative) nature of science.

• Scientific Methods of Discovery
  o Understand the methods scientists use to learn about the natural world (observing; questioning; formulating testable deductive hypotheses; controlled experimentation when possible; observing a wide range of natural occurrences and discerning (inducing) patterns).
  o Apply physical/natural principles to analyze and solve problems.

• Develop a Scientific Attitude
  o Develop habits of mind that foster interdisciplinary and integrative thinking (within biology; between biology and other sciences; between science and other disciplines).
  o Develop an appreciation for the scientific attitude - a basic curiosity about nature and how it works.

• Develop scientific analysis and communication skills
  o 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).
  o Understand the probabilistic nature of science and the use/application of inferential statistics to test hypotheses.
  o Develop scientific information literacy (library, internet, databases etc…); find and evaluate the validity of science-related information.
  o Communicate scientific knowledge, arguments, and ideas in a variety of different contexts (scientific, social, cultural), utilizing a variety of different media (scientific articles, policy statements, editorials, oral presentations etc.).
  o 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.
  o Develop an appreciation of humans as a part of the biosphere and the impact of biological science on contemporary societal/environmental concerns.
  o 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

1 This learning goal will be measured as part of the general education assessment. The specific learning outcome to be measured is: Students can apply physical/natural principles to analyze and solve problems.

2 This learning goal will be measured as part of the general education assessment. The specific learning outcome to be measured is: Students can demonstrate an understanding of the impact that science has on society.
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 112 lab as part of
the multi-week student-directed independent research project. In this project students use data they collect (or
has been collected in actual research investigations) to test an hypothesis of their choosing. These projects may
be themed, with all student groups addressing different aspects of a larger question, emphasizing the
interdependence of various research groups needed to address complicated problems. This multi-week project
begins the class identifying what questions need to be addresses in the larger problem. Individual student groups
then become experts in these areas of the larger problem. The smaller research teams develop a hypothesis, and
write a research proposal to test their hypothesis. Students collect (or use already collected data), summarize and
statistically analyze the data, and draw conclusions.
Learning Outcome #2 - Students demonstrate an understanding of the impact that science has on society.
Biology 112 lab Students produce a written document based on one of the case-based labs (examples - policy
statement, article, stake-holder professional letter or poster) that 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 use of performance enhancing drugs in sports
- the development of antibiotic resistance in disease organisms