BIOL 101-02 CRN-20074 CONCEPTS AND APPLICATIONS IN BIOLOGY I LECTURE
ONLINE INSTRUCTION WITH SYNCHRONOUS SCHEDULED MEETINGS (3.0 credits)

Instructor: Dr. Andy Shedlock, Biology Department
Scheduled Class Time: MWF 10:00-10:50AM
REQUIRED Synchronized Online Weekly Quiz and Discussion: WEDNESDAYS 10:00-10:50AM
OPTIONAL Online Open Format Q&A Engagement: MONDAYS 10:00-10:50AM
OFFICE HOURS: FRIDAYS 10:00-10:50AM
DEDICATED BIOL 101-01 EMAIL = SHEDLOCKBIOL@GMAIL.COM
(PLEASE DO NOT USE shedlockam@cofc.edu)

Response Times: Emails: typically within 48 hrs. Grading on quizzes and exams usually 3-5 days or
less depending on content.

Textbook: We will not use any particular textbook. Slide sets and multi-media resources used in lecture
will be made available to students on OAKS. You will need to use internet access via a remote computer
connection to function in our online section of the course.

OAKS and ZOOM: All course material and associated online activities will be managed on OAKS,
including slides, hyperlinks, videos, discussions, document sharing, exams, and quizzes. Synchronized
class meetings will use the ZOOM online video conference platform. All zoom meetings will be hosted by
the instructor and links to join all scheduled zoom meetings will be accessible through the OAKS
homepage Content menu and Course Schedule tab.

Individual responsibility for internet connectivity: As a student enrolled in an online remotely
instructed CoFC course, it is your responsibility to make sure you can function remotely with your
computer reliably on OAKS (including VoiceThread) and Zoom. Check the reliability of your connectivity in
advance BEFORE you need it to participate in synchronized activities such as taking quizzes and exams.
If you are having technical problems functioning with your internet connectivity and online computer
accounts do not hesitate to contact the CoFC Office of Information Technology (https://help.cofc.edu/ | (843) 953-3375) for technical support.

Check OAKS daily for updated course info and announcements. You will see announcements on the
BIOL 101-02 homepage about upcoming scheduled assignments and exams as well as tips for studying
the material effectively and navigating the content modules listed in the Table of Contents.

READ THE SYLLABUS (Repeat as Necessary): The syllabus on OAKS is the centerpiece of all course
information and you need to read it and re-read it throughout the semester to anticipate accurately how to
participate effectively. You need to check the syllabus carefully to answer FAQs and for updates
throughout the semester. To promote comprehension of the syllabus in a timely manner, an OPTIONAL
10-question 20-Extra-point quiz about detailed syllabus content will be given at 10AM on WED JAN 19 on
OAKS. These will be easy extra points to earn if you take some time to study the syllabus conscientiously as an important practical investment for your success in the class.

Netiquette and Professional Code of Online Conduct: “Netiquette” (network x etiquette) is a term that
refers to professional online conduct. Because online communication often requires technical
troubleshooting in remote situations and sometimes lacks nonverbal cues present in face-to-face
interactions, misunderstandings and conflict can easily arise. Thus, please abide by the following
netiquette rules when communicating with your course instructor and fellow classmates and colleagues:

• Be patient, tolerant, inclusive, and forgiving. Anyone can make a mistake. We’re all learning together
and facing many challenges that deserve a respectful and positive attitude of supportive engagement.
• Keep the dialog respectful, collegial and professional. We each have different backgrounds, experiences,
philosophies, and opinions and that diversity is a great asset for higher education!! We do not have to
agree to learn from one another or engage in mutually respectful and rewarding discussion.
• Be mindful of and strive to avoid “flames”. These are outbursts of extreme emotion or opinion.
• Be visually respectful with digital camera and imaging. We are sharing images either live or posted
online that should be respectful and appropriate for professional engagement.
• Beware of excessive capitalization. Using all capital letters excessively is the equivalent of yelling.
• Think and double check before you hit the enter/reply button. Once posted, you can’t take it back!
**Honor Code:** Please read the CofC Honor Code (see Appendix I below) and take it seriously. The College uses the Honor Code to enforce respectful honest responsible student behavior according to established institutional policies, so do not make the mistake of ignoring it at your own risk.

**COVID-19 and Personal Health:** Because of the pandemic, you will need to manage your individual health according to the many pandemic policies and student support resources being communicated to you by the CofC Admin and posted on CofC websites. If you need help, you are not alone, so please do not hesitate to reach out to these campus support professionals who are on standby 24/7 to give you the support you need to stay safe, healthy, and productive during this challenging time for everyone at the College. A full menu of updated policies and student support resources related to the COVID-19 pandemic can be found on the Back on the Bricks website https://cofc.edu/back-on-the-bricks/index.php. The CofC Counseling Center (https://counseling.cofc.edu/) also provides a variety of confidential health and wellness support services to make sure you can get the support you need when you need it.

**Digital Attendance: NO PARTICIPATION = NO POINTS.** Because this is large online class with remote instruction, online participation is the same thing as digital “attendance”. Participation is thus required in order for you to earn points for synchronized class activities such as exams and quizzes and group discussion. Please note that your remote participation is graded and recorded in quantitative detail based on the history of your individual student online activities logged automatically by the OAKS and Zoom platforms. You should always remember that if you are logged into OAKS or Zoom, everything you do on your phone or computer is recorded by the College of Charleston.

**HOW TO DO WELL IN THIS CLASS:** Our syllabus is designed to reinforce the primary learning objectives of the integrative topical course material through both asynchronous (self-paced) and synchronous (scheduled) active, conscientious engagement with the weekly material posted on OAKS. **You should expect to spend at least 4-6 hours per week engaging with the course material.** Each week you will receive a study guide to the weekly topic. Our weekly quizzes and interactive discussions will help you stay on schedule and keep a balanced sustainable pace of focused learning week by week through the entire semester. Midterm Exams, the Optional Review/Makeup Quiz and the Final Exam all reinforce your weekly active engagements of the material such that if you are keeping on schedule and staying actively engaged with the material each week, your participation will be productive and will continually reinforce and strengthen your active learning skills. Therefore, if you stay engaged with the weekly material conscientiously, it is highly likely you will come to understand it thoroughly and will be empowered to think critically and synthetically in a scientifically literate manner so that you can earn a good grade in the class.

**SCHEDULE FOR TEN MODERN REAL-WORLD WEEKLY THEMES COVERED IN THIS COURSE**

**PART 1**

**ORIENTATION AND THE SYLLABUS WED JAN 12**

*Review of syllabus content and course learning priorities*

**SYLLABUS CONTENT QUIZ (10 T/F QUESTIONS, 20-POINTS) WED JAN 19**

1. *Scientific literacy and intellectual self-defense in the age of the internet* (e.g., COVID-19)
   - THEME 1 QUIZ WED JAN 26
2. *Evolution as a force of nature.* Fact YES. Theory YES. Belief system NO.
   - THEME 2 QUIZ WED FEB 2
   - THEME 3 QUIZ WED FEB 9
4. *Cosmic evolution and astrobiology.* *Are we alone in the universe?*
   - THEME 4 QUIZ WED FEB 16
5. *The Central Dogma and Gene Control*
   - THEME 5 QUIZ WED FEB 23
6. *Genomics, precision medicine, and synthetic biology* (not on Exam 1)

**EXAM 1 WED MAR 2 10:00-11:00 AM ON OAKS**

*Covers lecture themes 1 through 5*
PART 2
THEME 6 QUIZ WED MAR 16
7. Biodiversity. What is it, why do we need it, how should we manage it?
THEME 7 QUIZ WED MAR 23
8. Pollution, environmental health, and the quest for sustainability
THEME 8 QUIZ WED MAR 30
9. Population growth, agriculture, water, and food security
THEME 9 QUIZ WED APR 6
10. Climate change, carbon cycle, notes from the fossil record and oceanography
WEEK 10 QUIZ WED APR 13
Course summary and integrative synthesis; End of semester considerations

EXAM 2 WED APR 20 10:00-11:00 AM ON OAKS
Covers lecture themes 6 through 10

OPTIONAL REVIEW / MAKE-UP QUIZ MON APR 25 10:00-11:00 AM ON OAKS
(WORTH 60 EXTRA POINTS - allows students to recover points from missed weekly quizzes)
Reviews same material covered by Quizzes 1-10

FINAL EXAM SAT APR 30 1-3PM ON OAKS
Two-part format; Parts 1 and 2 cover the same material covered by Exams 1 and 2, respectively

Weekly Quizzes & Q&A Zoom Discussions

Each Wednesday according to the above weekly theme schedule there will be a 5-question 10-point True/False QUIZ taken synchronously on OAKS starting at 10AM, followed by introduction of new lecture material for the next weekly theme. Quizzes cover the lecture materials posted online on OAKS for weekly themes 1-10. Quiz answers can be reviewed by interactive class-wide group discussion via Zoom during the optional Monday synchronized online Q&A forums. In this manner the course proceeds through a consistent cyclic weekly “rhythm” that allows for both asynchronous self-paced independent study and synchronized in-class group engagements, including weekly quiz assessment and interactive student-driven discussions.

Quiz Specs

• All questions are T/F format worth 2 points for each question
• All quizzes are posted on OAKS as time-restricted quiz documents
• Ten Wednesday 10AM 5-T/F synchronous online quizzes (10 points x 10 weeks = 100 points total)
• One OPTIONAL Review/Makeup Quiz (3 questions per theme x 10 themes = 60 EXTRA points)
• THERE ARE NO INDIVIDUAL WEEKLY MAKE-UP QUIZZES, however, the optional 60-extra-point comprehensive Review/Makeup Quiz at the end of the semester allows students to recover lost points from missing weekly quizzes.

Exam Specs

• EXAMS 1 and 2 will be taken on OAKS synchronously during Wed class time. Each exam will be 50 T/F questions. Exam 1 covers lecture themes 1-5. Exam 2 covers lecture themes 6-10.
• The FINAL EXAM will be a comprehensive two-hour exam taken in two parts.
• Part 1 (50 T/F questions) will cover the same material as Exam 1, which is lecture themes 1-5.
• Part 2 (50 T/F questions) will cover the same material as Exam 2, which is lecture themes 6-10.

Point Totals

100 for QUIZZES (5 T/F Qs per each weekly lecture theme 1-10)
100 for EXAM 1 (50 T/F Qs on lecture themes 1-5)
100 for EXAM 2 (50 T/F Qs on lecture themes 6-10)
100 for FINAL EXAM PART 1 (50 T/F Qs, same coverage as for Exam 1)
100 for FINAL EXAM PART 2 (50 T/F Qs, same coverage as for Exam 2)
100 for PARTICIPATION (OAKS logged activity summary; active Zoom engagement)
600 MAXIMUM POINTS = 100% OF CLASS GRADE
Extra Points
20 maximum extra points may be added to the 600-point balance from the Optional Syllabus Quiz
60 maximum extra points may be added to the 600-point balance from the Optional Review Quiz

Earned Letter Grade Scale for the Course
90-100% Guarantees A- or higher
80-89% Guarantees B- or higher
70-79% Guarantees C- or higher
60-69% Guarantees D- or higher
<60% = F

IF YOU NEED HELP:
DO NOT HESITATE to reach out to me confidentially by email at SHEDLOCKBIOL@GMAIL.COM if you are having problems participating successfully in our class for any reason. There are also many excellent student support services at CoC with professional staff on standby to provide guidance and help make sure you can be successful. Two extremely helpful websites to keep in mind if you want to reach out for a full menu of student academic support options (including peer tutoring services) are:
1) THE CENTER FOR STUDENT LEARNING (https://csl.cofc.edu)
2) THE CENTER FOR ACADEMIC PERFORMANCE AND PERSISTANCE (https://capp.cofc.edu/)

APPENDIX I:

*****IMPORTANT*****  Honor Code and Academic Integrity
http://studentaffairs.cofc.edu/honor-system/studenthandbook/index.php
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. Students may have the opportunity to meet with the Dean of Students and may be brought before the Honor Board. Depending on the severity, incidents may lead to a written intervention, a XF in the course indicating failure of the course due to academic dishonesty, disciplinary probation, suspension (temporary removal) or expulsion (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.

Parity Statement
Any student eligible for and needing academic adjustments or accommodations through the CENTER FOR DISABILITY SERVICES or SNAP program (https://disabilityservices.cofc.edu) because of a documented disability is requested to speak with the professor in a timely and confidential manner so that your needs can be addressed. Athletes, International or ESL students are encouraged to discuss any concerns with the Instructor in a timely manner.

BIOL 101/L – 102/L Gen-Ed Course Learning Goals and Outcomes

Course Learning Goals
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 may 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 Archaens
  -"Protist" Lineages
  -Plants
  -Fungi
  -Animals
• Plant Form & Function
• Animal Form & Function
• Principles of Ecology

Course Learning Outcomes and Core Competencies

• Nature of Scientific Knowledge
  -Students will 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.
  -Students will 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.
- Students will 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.
- Students will understand the differences between science and technology but also their interrelations.
- Students will understand the dynamic (tentative) nature of science.

• Scientific Methods of Discovery
  - Students will 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.)
  - Students will apply physical/natural principles to analyze and solve problems.

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

• Developing scientific analysis and communication skills
  - Students will 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).
  - Students will understand the probabilistic nature of science and the use/application of inferential statistics to test hypotheses.
  - Students will develop scientific information literacy (library, internet, databases etc...); finding and evaluating the validity of science-related information.
  - Students will 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...).
  - Students will 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.
  - Students will develop an appreciation of humans as a part of the biosphere and the impact of biological science on contemporary societal/environmental concerns.
  - Students will develop 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.

Learning Outcome #2: Students demonstrate an understanding of the impact that science has on society. BIOL 102 lab students produce a written document (examples - 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

1 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.
2 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.