BIOL 101-01 CRN20084 CONCEPTS AND APPLICATIONS IN BIOLOGY 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 Synchronous Online Open Format Q&A Engagement: MONDAYS 10:00-10:50AM
OFFICE HOURS: During Monday class time via Zoom or by appointment
DEDICATED BIOL 101-01 EMAIL: shedlockam@cofc.edu
(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, VoiceThread audio documents, 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 invitations for all zoom meetings will be emailed to students in advance of the scheduled meetings.

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 101-01 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 as well as in the VoiceThread environment accessible through the VoiceThread portal hyperlinked in the lower right panel of the BIOL 101-01 homepage.

Orientation and Introductions: On the first day of synchronized online instruction (10AM WED JAN 13) we will take time to review the syllabus and exchange some informal introductions via Zoom. The goal will be to relax and get to know each other while highlighting the eclectic diversity of students who normally enroll in BIOL 101 from across the entire campus community. This diversity for which 101 can be proud is a great asset for enhancing our shared active learning experiences throughout the semester. The syllabus 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. To promote comprehension of the syllabus in a timely manner, a 10-question 20-point quiz about detailed syllabus content will be given at 10AM on WED JAN 20 on OAKS. These will be easy points to earn if you take some time to study the syllabus conscientiously as an important practical investment for your success in the class.

Building Community and Open Communication in a Safe Online Learning Environment
Everyone is encouraged to “jump in” to the discussion forums listed in Discussions under the Communication tab of OAKS and exchange questions-answers, concerns, ideas, helpful tips and anything you would like to share to get to know each other better and enhance our interactive online learning experience. This community is aimed to promote peer-driven community engagement between students in a spontaneous and informal manner. The Instructor may check postings and participate in discussion forums periodically to facilitate building our learning communities in a safe and productive manner using professional netiquette and respectful codes of online conduct outlined below.
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!
• Tend your inbox. If you are engaging in email exchanges that require dialogue or posted discussion forums, reply to everyone who has contributed to the conversation you started, but do not add participants casually or unnecessarily who have not been part of the original thread of correspondence.
• Use clear and descriptive subject lines in emails and discussion board threads.
• Use abbreviations or acronyms only if the entire class knows them. If not, define them.

Attendance Policy: Please read the CoF 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: Because of the pandemic, there will be no use of absentee memos. Functionally, this means the attendance policy is based on active engagement in online asynchronous and synchronous course activities as recorded comprehensively by your individual OAKS account activity logs. Having more freedom requires more responsibility and more honesty, not the opposite. This means you will have more freedom to manage your time responsibly and learn interactively as well as individually at your own pace week by week using the online class material which will be available to you 24-7 on OAKS.

NO PARTICIPATION = NO POINTS. THERE IS NO MAKE-UP POLICY FOR MISSING SYNCHRONIZED CLASS ACTIVITIES. Online participation requires digital “attendance” in order for you to earn points for graded assignments and 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 platform.

Empowerment, Active Learning, and the Four C’s. Our section of Biology 101 is built upon the mission of individual empowerment via active learning skill development and scientific literacy. We will cover major themes of public interest that are relevant to sustainable human welfare and rooted in concepts of evolutionary, molecular, and cellular biology. We will strengthen our scientific literacy and apply it to think Critically, Collaborate productively, Communicate effectively, and solve problems Creatively (The 4 C’s). This method of discovery requires curiosity and imagination and a sense of pride in the ownership of your original ideas and team-driven design and production of shared novel course material. For this reason our so-called “flipped” course syllabus is a process-oriented, student-driven, multi-disciplinary vehicle based on a highly successful active learning model that integrates STEAM fields (Science, Technology, Engineering, Art, and Math). This shared experiential approach to education contrasts with the traditional content-heavy fact-oriented didactic lecture model (which has proven to be much less effective for teaching science over the past 100 years and is especially outdated in the age of the internet). This means YOU are going to drive the course forward week by week as a diverse group of collaborative explorers of your own imagination, not passive consumers of somebody else’s dogma.

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 and also a VoiceThread audio lecture that guides you through the course content and how to study effectively and efficiently for comprehension (not memorization) of the integrative lecture material posted on OAKS. 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 INTRODUCTIONS WED JAN 13
Review of syllabus content and course learning priorities
SYLLABUS CONTENT QUIZ (10 T/F QUESTIONS, 20-POINTS) WED JAN 20
1. Scientific literacy and intellectual self-defense in the age of the internet (e.g., COVID-19)
THEME 1 QUIZ WED JAN 27
2. Evolution as a force of nature. Fact YES. Theory YES. Belief system NO.
THEME 2 QUIZ WED FEB 3
THEME 3 QUIZ WED FEB 10
4. Cosmic evolution and astrobiology. Are we alone in the universe?
THEME 4 QUIZ WED FEB 17
5. The Central Dogma and Gene Control
Intro to Concept Maps 1 & 2
THEME 5 QUIZ WED FEB 24
6. Genomics, precision medicine, and synthetic biology (not on Exam 1)
CONCEPT MAPS 1 & 2 DUE MON MAR 1
Mitosis (1) and Meiosis (2)
EXAM 1 WED MAR 3 10:00-11:00 AM ON OAKS
Covers lecture themes 1 through 5 including Mitosis and Meiosis

PART 2
THEME 6 QUIZ WED MAR 10
7. Biodiversity. What is it, why do we need it, how should we manage it?
THEME 7 QUIZ WED MAR 17
8. Pollution, environmental health, and the quest for sustainability
THEME 8 QUIZ WED MAR 24
9. Population growth, agriculture, water, and food security
THEME 9 QUIZ WED MAR 31
10. Climate change, carbon cycle, notes from the fossil record and oceanography
Intro to Concept Maps 3 & 4
WEEK 10 QUIZ WED APR 7
Course summary and integrative synthesis; End of semester considerations
CONCEPT MAPS 3 & 4 DUE MON APR 12
Photosynthesis (3) and Cellular Respiration (4)
EXAM 2 WED APR 14 10:00-11:00 AM ON OAKS
Covers lecture themes 6 through 10 including Photosynthesis and Cellular Respiration
OPTIONAL REVIEW QUIZ MON APR 19 10:00-11:00 AM ON OAKS (WORTH 40 EXTRA POINTS)
Covers same material covered by Quizzes 1-10 (does not include material posted for concept maps)
FINAL EXAM 8-10AM MON APR 26 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 (2 questions per theme x 10 themes = 40 EXTRA points)
• THERE ARE NO INDIVIDUAL WEEKLY MAKE-UP QUIZZES. BUT, that’s why there is an optional 40-extra-point comprehensive Review/Makeup Quiz at the end of the semester so that students can recover lost points for missing up to four regularly scheduled 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 1 includes Mitosis and Meiosis (the same material used to create Concept Maps 1 & 2)
• Part 2 (50 T/F questions) will cover the same material as Exam 2, which is lecture themes 6-10.
• Part 2 includes Photosynthesis and Respiration (the same material used to create Concept Maps 3 & 4)

Concept Maps and Open Book Creative Synthesis

On Feb 17th (Part 1 of the syllabus) and March 31st (Part 2 of the syllabus) there will be two separate concept map assignments introduced (each assignment includes two hand-drawn maps, thus 4 maps x 25 points each = 100 points total). Individual student maps will be uploaded on OAKS in the form of digital photo image files (jpeg or pdf format) of hand-drawn hardcopies of integrated summary diagrams of the physiological processes of Mitosis and Meiosis (Maps 1 and 2) and Photosynthesis and Cellular Respiration (Maps 3 and 4). The purpose of these open-book active learning assignments is to integrate fundamental concepts and synthetic thinking by creating visually engaging and informative hand-drawn summary diagrams of key physiological processes essential for life on earth, and by extension, the environmental sustainability of human civilization in the 21st Century. Detailed instructions for how to complete and submit these concept map assignments will be posted on OAKS.

Point Totals

120 for QUIZZES (20 on syllabus content plus 100 on weekly lecture themes 1-10)
100 for EXAM 1 (50 T/F Qs on lecture topics 1-5, plus mitosis and meiosis)
100 for EXAM 2 (50 T/F Qs on lecture topics 6-10, plus photosynthesis and cellular respiration)
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 CONCEPT MAP ASSIGNMENTS (25 points per map x 4 maps)
80 for PARTICIPATION (OAKS logged activity summary; deadlines; active Zoom engagement)
700 MAXIMUM POINTS = 100% OF CLASS GRADE
40 maximum extra points may be added to this 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 CoFC 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 support options (including academic 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

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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.