SYLLABUS

BIOLOGY 111 INTRODUCTION TO CELL AND MOLECULAR BIOLOGY LECTURE
TR 1120-1235, HWW217, SECTION 03
INSTRUCTOR: ANDY SHEDLOCK = **SHEDLOCKBIOL@GMAIL.COM (USE THIS ADDRESS)**
OFFICE HOURS: THURSDAY 130-330PM KUDU COFFEE SHOP (MOSTLY FOR ADVICE)
WEEKLY **SUPPLEMENTAL INSTRUCTION** SESSIONS (SI LEADER DETAILS TBA)
GO TO THESE SESSIONS FOR CONTENT Q&A AND HELP WITH PROBLEM SOLVING

TEXTBOOK (REQUIRED)
-BIOLOGICAL SCIENCE, 6TH EDITION, FREEMAN ET AL, PEARSON PUBLISHING
(CAUTION: USING EARLIER EDITIONS IS NOT RECOMMENDED AND NOT SUPPORTED)

OAKS
-CHECK BIOL111-03 COURSE WEBSITE DAILY FOR INFO AND UPDATES

LECTURE SLIDES FORM THE BACKBONE OF THE COURSE
-WILL BE POSTED ON OAKS IMMEDIATELY BEFORE OR SHORTLY AFTER LECTURE
-THE LECTURE SLIDES ARE TAKEN DIRECTLY FROM THE TEXBOOK
-USE THE SLIDES TO GUIDE YOUR READING AND COMPREHENSION OF TEXT MATERIAL

IN CLASS VIDEOS & DISCUSSION
-WILL BE POSTED ON OAKS WEEKLY
-USED TO PROMOTE CURIOSITY AND SYNTHETIC THINKING THOUGH ACTIVE LEARNING

ONLINE LEARNING TOOLS
-MASTERING BIOLOGY (OPTIONAL) PROVIDES EXTENSIVE ONLINE PRACTICE MATERIAL

COURSE DESCRIPTION
Introduction to Cell and Molecular Biology BIOL 111 lecture is a foundation course for science majors emphasizing critical thinking skills and the concepts of structure and function in biological systems at the molecular and cellular levels. UNIT 1 covers the scientific process, the nature of life and biochemistry; UNIT 2 covers cell structure and function, respiration, and photosynthesis; UNIT 3 covers the Central Dogma of Molecular Biology and modern aspects of molecular genetics and biotechnology. Pre-requisites: None. Biology 111L laboratory is a co-requisite, unless you already have credit for the laboratory portion of the course.

EXAMS
-MULTIPLE CHOICE QUESTIONS BASED ON UNIT CHAPTERS COVERED UP TO AND INCLUDING THE WEEK BEFORE THE EXAM; USE SLIDES AND TEXT TO PREPARE
-**EXAM 1** WILL COVER UNIT 1 AND WILL BE ON **TUESDAY SEPTEMBER 26**
-**EXAM 2** WILL COVER UNIT 2 AND WILL BE ON **TUESDAY OCTOBER 24**
-**EXAM 3** WILL COVER UNIT 3 AND WILL BE ON **THURSDAY NOVEMBER 30**
-**FINAL EXAM** – COMPREHNSIVE COVERAGE BASED ON ALL LECTURE MATERIAL
-FINAL EXAM IS SAME FORMAT AS EXAMS 1-3; **FINALS CANNOT BE RESCHEDULED**

QUIZZES
-WE WILL HAVE A QUIZ DURING EVERY CLASS BUT THE TIMING WILL BE RANDOMIZED
-QUIZZES WILL COVER MATERIAL FROM THE IMMEDIATELY PRECEEDING LECTURE
-MULTIPLE CHOICE FORMAT BASED ON SLIDES SHOWN IN THE CLASS
-ANSWERS ARE DERIVED IN CLASS VIA INTERACTIVE GROUP DISCUSSIONS
-NO QUIZ MATERIALS WILL EVER BE DISTRIBUTED, YOU MUST ACQUIRE THEM IN CLASS
-GRADED QUIZ SCORES WILL BE PROVIDED AT END OF THE SEMESTER FOR CHECKING

QUIZZES = ATTENDANCE = PARTICIPATION
-SIGNED HARDCOPIES OF QUIZ GRADE SHEETS WILL BE USED TO RECORD ATTENDANCE
-ATTENDANCE WILL BE GRADED BASED ON PERCENTAGE OF PRESENCE/ABSENCE
-PARTICIPATION IN CLASS DISCUSSIONS WILL BE NOTED AS A FACTOR IN POSSIBLE EXTRA CREDIT FOR THIS SUBSET OF YOUR GRADE.
-NO DOCUMENTATION OF REASON FOR ABSENCE = NO EXEMPTION FOR ATTENDANCE

GRADING OF THE COURSE BASED ON 1000 POINTS:
FINAL DISTRIBUTION OF CLASS POINTS WILL DETERMINE FINAL LETTER GRADES
>90% GUARANTEES A
>80% GUARANTEES B OR HIGHER
>70% GUARANTEES C OR HIGHER
-MIDTERM EXAMS: 3 X 100 = 300 PTS
-FINAL EXAM = 300 PTS
-QUIZZES = 200 PTS
-PARTICIPATION = 200 PTS

TENTATIVE CLASS SCHEDULE (THIS WILL BE DYNAMIC)

T.8.22	Course Intro and Big Picture	
R.8.24	Chapter 1	Biology and the tree of life
T.8.29	Chapter 2	Water and carbon: the chemical basis of life
R.8.31	Chapter 2	Water and carbon: the chemical basis of life
T.9.5	Chapter 3	Protein structure and function
R.9.7	Chapter 3	Protein structure and function
T.9.12	Chapter 4	Nucleic acids and the RNA world
R.9.14	Chapter 4	Nucleic acids and the RNA world
T.9.19	Chapter 5	Introduction to carbohydrates
R.9.21	Chapter 6	Lipids, membranes, and the first cells
T.9.26	**EXAM 1**	**UNIT 1 MATERIAL**
R.9.28	Chapter 7	Inside the cell
T.10.3	Chapter 8	Energy and enzymes: an introduction to metabolism
R.10.5	Chapter 9	Cellular respiration and fermentation
T.10.10	Chapter 9	Cellular respiration and fermentation
R.10.12	Chapter 10	Photosynthesis
T.10.17	Chapter 10	Photosynthesis
R.10.19	Chapter 12	The cell cycle

T.10.24	**EXAM 2**	**UNIT 2 MATERIAL**
R.10.26	Chapter 13	Meiosis
T.10.31	Chapter 14	Mendel and the gene
R.11.2	Chapter 15	DNA and the gene: synthesis and repair
T.11.7	Chapter 16	How genes work
R.11.9	Chapter 17	Transcription, RNA processing, and translation
T.11.14	Chapter 18	Gene control in prokaryotes
R.11.16	Chapter 19	Gene control in eukaryotes
T.11.21	Chapter 21	Genes development and evolution
R.11.23	No Class	Thanksgiving Holiday
T.11.28	Chapter 20	Genomics, biotechnology, and the future
R.11.30	**EXAM 3**	**UNIT 3 MATERIAL**
T.12.12	**8-11AM**	**COMPREHENSIVE FINAL EXAM**

OTHER FORMALITIES

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 SNAP program 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.

OFFICIAL BIOL 111/L – 112/L COURSE LEARNING GOALS AND 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:
<u>Biology 111 & Biology 111L</u>

- 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**
  - 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.
  - 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 a world defined by the laws of chemistry and physics.
  - Understand the differences and relationships among scientific theories, hypotheses, facts, laws, & opinions.
  - Understand the differences between science and technology, but also their interrelations.
  - Understand the dynamic (tentative) nature of science.

- **Scientific Methods of Discovery**
  - [1]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).
  - Apply physical/natural principles to analyze and solve problems**.**

[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.*

- **Develop 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…); find and evaluate the validity of science-related information.
    - 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.).
    - 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 [2]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.

[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.*