

BIOL 111: Introduction to Cell and Molecular Biology
Fall 2016 Syllabus
Monday, Wednesday and Friday 1:30-2:20pm
HWW 213

Instructor:	Dr. Mauhamad Baarine
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Supp. Instructor	TBA ; Hours: TBA

Course Description and Objective: This course will explore the basic processes, concepts, and theories of biochemistry and modern biology, including cell theory, utilizing examples from everyday life. The objectives will be:

1. To learn about the structures and functions of the biochemicals, organelles, and cells in the variety of living organism in the world around us;
2. To explore and further your understanding of the major concepts, theories, and processes, including cellular respiration, which relate to living organisms, and the historical context in which these concepts and theories were developed;
3. As these processes are studied, to learn to think critically about them – to be able to use the scientific method to analyze a problem, formulate a hypothesis, and develop a means of finding a solution;
4. To communicate in ways appropriate to the biological sciences about the processes and concepts studied.

Grading: Based on a total of **220 points** by the following system:

Attendance: 10 points

In-class group assignments: 45 points (points vary per assignment)

Homework Assignments: 30 (3 assignments worth 10 points each)

Unit Exams: 75 points (30 points per exam)

Final Exam: 60 points

The final grade will be

Final Grading Scale:

A (93.5-100%), A- (90-93.49%), B+ (88.5-89.9%), B (83.5-88.49%), B- (80-83.49%), C+ (78.5-79.9%), C (73.5-78.49%), C- (70-73.49%), D+ (68.5-69.9%), D (63.5-68.49%), D- (60-63.49%), F (<60%)

Required Materials:

1. "Biological Science" by Scott Freeman, 6th edition
2. i-clicker2 remote response pad

Optional: "Study Guide for Biological Science", 6th edition; "MasteringBiology" course access

Attendance: At the beginning of every class period (except for exam days), students will be given one question to answer via the i-clicker response system. The question will be pulled from the previous lecture. These questions will not only help the students gauge how well they are understanding the material, but also count for attendance points. Students will be given 0.25 points for an attempt of the question and an additional 0.25 points if the answer is correct. Students that

arrive late to class or miss the class entirely, without prior permission from professor, will receive 0 attendance points for the day.

i-Clicker2: available at CofC bookstore. Go to <http://www.iclicker.com/registration/> to register your i-clicker. For your "Student ID" at this website, use your CofC Student ID. For the "Remote ID," look at the back of your i-clicker and type the code that appears under the bar code. If any of this does not work, please come and see the professor for help. You must be registered before **August 29th**.

Lectures: This class has been structured so that the first half to two-thirds of class time will be spent going through the traditional PowerPoint lectures. The remaining class time will be filled with class discussions and group activities. Therefore, the PowerPoint material is meant to only to provide illustrations and outline topics but not to write out every idea. The PowerPoint material will be available on OAKS after the lecture. it's highly recommended that you read the assigned chapter before the class.

In-Class Group Assignments: Throughout the semester there will in-class scientific activities. These activities are meant to drive class discussions. The students will be graded as a group on the assignments that are turned in. At the end of the semester the students will give peer evaluations on the other members of their group. These peer evaluations will not add to your final assignment grade, but a poor evaluation will subtract up to 20% off your group assignment grade. Also, any material discussed during the in-class activities is considered potential exam questions. In-class activities will **NOT** be available on OAKS. It is highly suggested that you do not miss class.

Homework Assignments: There will be four homework assignments, one from each unit as well as the passport assignment. Each of these homework assignments are worth 5 points. The passport assignment will be given in class on the first day. The remaining homework assignments will be found on the OAKS.

MASTERINGBIOLOGY (OPTIONAL): This is an excellent online study resource provided by Pearson Education. I have setup a course id (MBBAARINE53466) for this class. You must have an access code comes to use this online resource. If your book does not have an access code, you can buy one for \$66 from Masterbiology.com.

Exams: There will three unit exams each worth 30 points and one cumulative final exam worth 60 points. Each of the exams will consist of multiple choice, true/false, fill in the blank, and short answer questions. Test questions will be pulled from the textbook, PowerPoint lectures, in-class activities, class discussions, and homework assignments. FYI: If your **hand writing is illegible** you will receive **0 points** for that question. **NO MAKE-UP EXAMS** will be given. Only medical conditions with a written note from a medical professional will be excused. In this case, your grade will be re-weighted for the exams that were attended.

Students with Disabilities: If there is a student in the class who has a documented disability and has been approved to receive accommodations through the Center for Disability Services / SNAP, please come and discuss this with the professor after class or during office hours

Supplemental Instructor and Tutoring Available: There is a supplemental instructor (SI) for this class. This is not a tutoring service. It is a discussion based group meeting that helps students acquire and refine the tools essential for learning the course content. The SI may discuss course concepts, help develop strategies for studying course material, work through review problems, and review class notes.

If additional one on one help is needed, students are recommended to visit the Center for Student Learning (CSL). The CSL now has a walk-in science tutoring lab. Students can use the walk-in lab during the scheduled times of operation which can be found at <http://csl.cofc.edu/labs/>.

Academic Honor and Integrity:

Excerpt from the College of Charleston Honor Code:

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 XF 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 X to be expunged. 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 at <http://studentaffairs.cofc.edu/honor-system/studenthandbook/index.php>

****Dates and Course content on this syllabus are subject to change****

Course Outline:

Date	Lecture
W Aug 24	Class Orientation, Chapter 1
F Aug 26	Chapter 1 and 2
M Aug 29	Chapter 2 Passport assignment due at the beginning of class, i-clicker must registered;
M Aug 29	Last day to drop/add
W Aug 31	Chapter 2
F Sept 2	Chapter 3
M Sept 5	Chapter 3
W Sept 7	Chapter 4
F Sept 9	Chapter 4; 5
M Sept 12	Chapter 5
W Sept 14	Chapter 6
F Sept 16	Chapter 6; Unit 1 Homework Assignment Due by 10pm
M Sept 19	Exam 1
W Sept 21	Chapter 7
F Sept 23	Chapter 7,8
M Sept 26	Chapter 8
W Sept 28	Chapter 9
F Sept 30	Chapter 9 Unit 2 Homework Assignment Due by 10pm
M Oct 3	Chapter 10
W Oct 5	Chapter 10
F Oct 7	Chapter 11
M Oct 10	Chapter 11
T Oct 12	Chapter 12
F Oct 14	Exam 2
M Oct 17	Chapter 13
W Oct 19	Chapter 13; 14
F Oct 21	Chapter 14
M Oct 24	Chapter 15
W Oct 26	Chapter 15
Tr Oct 27	Last day to withdrawal with "W"
F Oct 28	Chapter 16; Unit 3 Homework Assignment Due by 10pm
M Oct 31	Chapter 16
W Nov 2	Chapter 17
F Nov 4	Chapter 17
W Nov 9	Chapter 18
F Nov 11	Chapter 19
M Nov 14	Chapter 19

W Nov 16 F Nov 18	Exam 3
M Nov 21	Chapter 20
M Nov 28	Chapter 20
W Nov 30	Chapter 21
F Dec 2	Revision Day
M Dec 5	Revision Day
W Dec 7	Cumulative Final Exam 12-3 pm

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 TRANS FORMATIONS 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**
 - 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**
 - ¹Understand 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.
- **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.

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 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 ²impact 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 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 organism

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.*

CougarAlert Display Information

When you receive an emergency message from the College of Charleston's CougarAlert System, the return e-mail address will be displayed as cougaralert@cofc.edu, and Caller ID will be displayed as 843.725.7246 (this is the College's Emergency Information Hotline).

Testing and Implementation

Testing will be conducted each semester to verify all systems are operating properly. The campus community will be notified via e-mail and web page postings when testing of the system will be conducted.

Blackboard Connect Software

[Blackboard Connect](#) is an emergency communication software that sends notification before, during and after an emergency. With this new system, the College will be able to communicate in many modes, including voice messages to home, work and cell phones; text messages to cell phones, PDAs and other devices; written messages to e-mail accounts; and messages to teletypewriters and telecommunication devices (TTY/TDD) for the hearing impaired. In combination with our existing communications methods and emergency response plans, this new notification system will significantly enhance the College of Charleston's ability to maintain a learning environment in which students are safe, secure and comfortable.

In an emergency, communications to the campus will be issued in the following priority order:

1. Message to the [Blackboard Connect](#) Emergency Notification System (phone and e-mail).
2. Recorded message to the College's Emergency Information Hotline, 843.725.7246.
3. Update to the Website.
4. Printed update sheets to be distributed and posted on campus (if necessary).

The CougarAlert system will only be used to notify you in the event of a campus crisis or emergency.