COURSE SYLLABUS

***BIOLOGY 141*, Foundations of Biology: Cells, Energy, and Organisms**

Course Information

Course number: BIOL 141
Number of Credits: 4 credits
Prerequisites: none
Semester/Year: Summer 2012; Session I – 6 weeks
Lecture Schedule: Mon/Wed/Fri 9:00 AM-11:50 AM (CASTLE, UC 115D)

General Information: BIOL 141, Foundations of Biology: Cells, Energy and Organisms, is a course designed for individuals who have completed high school biology and chemistry. This course is required for students majoring in Biology and Biochemistry and for pre-professional Allied Health students intending to enroll in BIOL 251. However, students from all disciplines are welcome. Much of what you learn this semester should be applicable to many areas of your own major. *If you feel your high school background in biology and chemistry is not adequate for this course, you should consider enrolling instead in **a non-majors course** with a lab such as SCI 100, BIOL 106, or BIOL 109.* NOTE 1: BIOL 141 does **not** include a lab. NOTE 2: BIOL 141 and 142 can be taken in either order. Thus, BIOL 142 may be taken **before** BIOL 141.

Required Text(s)

Freeman, Scott 2011. ***Biological Science,*** 4th edition. Pearson/Benjamin Cummings Publishing Company, San Francisco.

BIOL141 Blackboard:

All registered students should be automatically enrolled. This blackboard site contains grades, lecture objectives/outlines, additional readings, and/or study questions. It is the student's responsibility to check for new materials, some of which may be required to bring to class. I may also email the class to make announcements; therefore it is important for students to check this site and their UMBC email accounts on a regular basis.

Instructor Information

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Course Learning Outcomes

Students who complete Biology 141 should be able to:

I. Identify and distinguish between the structure of a "typical" plant, animal, and bacterial cell.

A. List the names and functions of each of the structures (organelles) within a cell.

B. Describe ways in which organelles work together to accomplish cellular functions.

C. Describe the composition, function and selective permeability of cell membranes.

II. Apply the principles of metabolism to the processes of cellular energetics.

A. Identify the basic properties of enzymes and describe their function and regulation.

B. Explain the fundamentals of cellular respiration and photosynthesis.

C. Describe the role of enzymes in the processes of photosynthesis and in cellular energy harvesting pathways.

III. Describe the fundamental processes involved in cell division.

A. Describe mitosis and meiosis.

B. Explain molecular mechanisms by which the cell cycle is regulated.

IV. Describe the "Central Dogma of Molecular Biology":

A. Identify/recall the structure of DNA and RNA.

B. Describe the processes of DNA replication, transcription, and translation.

C. List/describe the basic characteristics of the genetic code.

V. Plant Physiology

A. Describe the structure of the vascular plant body

B. Describe the importance of hormones in plant physiology

C. Explain the fundamentals of plant reproduction

VI. Animal Physiology

A. Explain the structure and function of the human digestive system.

B. Explain how/where digestive enzymes and hormones function in human digestion.

C. Describe how electrical signals are transmitted by neurons.

Goals: One goal of BIOL 141 is to present an overview of foundational concepts in contemporary biological science. The basic topics presented in this course are grouped into the broad categories in the Learning Outcomes. You will need to understand these concepts in order to answer the Pre-Exam Study Questions related to the topics listed in the syllabus.

A second goal for BIOL 141 is to sustain a classroom environment that promotes active learning. In addition to lectures you will be exposed to a number of different teaching approaches designed to make this class a learning experience that is personal, student-centered, interactive and relevant. These approaches are being used at a number of colleges and universities around the country in addition to UMBC, and there is ample evidence that they improve student understanding and retention. Some of you will have had experience with one or more of them. Many of you will not. If you find yourself uncomfortable with these methods, be patient. You will become accustomed to learning in new ways and will be amazed to find yourself learning more than you realize.

A third goal for BIOL 141 is to help students become more familiar with the questioning and interactive side of science. A typical view of "science" is that it consists of a large body of hard-to-remember and difficult-to-understand "facts" discovered by scientists who worked alone. As practicing scientists, we know that at the heart of science are the questions that scientists ask. The process of science involves working together with others to find answers to those questions, and then persuading the broader community of scientists that the answers are valid. We will not simply ask questions in this class, but will encourage you to ask questions of your own. We will also challenge you to find answers to your own questions, as well as ours, and to share your new understanding with your peers.

Dates	Topics*	Textbook Chapter
Week 1 May 29-June 1	Introduction, Cell Theory and Evolution **<u>UNIT I. Cellular Organization and Energetics</u>** **A. Cell Organization** -Membrane Biology -Cell Structure/Function **B. Cellular Energetics** -Energy and Enzymes	1 6 & 7 3.2/3.4/3.5
Week 2 June 4-8	-Cellular Respiration -Photosynthesis **UNIT II. Inheritance, DNA, and Central Dogma** **A. Inheritance** -Mitosis and the Cell Cycle/Meiosis **Exam 1- Friday June 8th 9:00 AM-10:30 AM** *(lectures May 29 through photosynthesis)*	9 10 11/12
Week 3 June 11-15	-Mitosis/Meiosis (continued) **B. Modern Genetics** -DNA and the Gene -DNA Synthesis and Repair	13.4:p.239-241 4/14
Week 4 June 18-22	-Genetic Code and the Central Dogma -Transcription, Translation, Mutation -Regulation of Gene Expression in Bacteria **Exam 2- June 22 9:00 AM-10:30 AM** *(Lectures Inheritance and modern genetics, through June 18)*	15/16 17
Week 5 June 25-29	**UNIT III. Plant Physiology** -Plant Growth, Reproduction, Life Cycle -Chemical Signals in Plants **UNIT IV. Animal Physiology** -Digestive System -Nerve Cells and the Nervous System ***Friday June 29th Exam 3-<u>ONLINE EXAM</u> covering transcription/translation/mutation/gene regulation; any short answer portion will be in class.***	 36.1-36.2;40; 39 41.2; 43; 45
Week 6 July 2-6	Animal Physiology continued ***I will hold a review session for the final on Thursday July 5th(time TBD)*** ***HOLIDAY Wednesday July 4th- NO CLASS***	
Friday July 6	**Cumulative Final Exam** *(includes plant and animal physiology in addition to previously tested lecture material)* 9:00 AM-11:50 AM	

*Topic assignments are ***tentative and may change.***

Note: It is expected that textbook chapters will be read before the lecture(s) in which a topic is covered, and not just the night before an exam. To help you remember to read ahead, **Reading Quizzes (RQs)** will be given online on Mastering Biology.

Explanation of Grading:

There will be a total of 500 possible points broken down as follows:

• Best 2/3 Lecture Exams @15 % each		=	30%	150 points
• Exam 3 & Cumulative Final Exam		=	30%	150 points
• In-Class Quizzes		=	15%	75 pts
• Reading Quizzes on MasteringBiology		=	10%	50 pts
• Study Questions		=	8%	40pts
• In-Class Activities		=	4%	20 pts
• Attendance		=	3%	15 pts
•	Total	=	100%	500 pts

Minimum Grading Scale:

There are a total of 500 points available to earn in the entire course. Final letter grades will be assigned according to the following scale:

$\geq$ 450 = A

400-449.9 = B

350-399.9 =C

300-349.9 = D

$\leq$ 299 =F

How Can Each and Every One of You Succeed in this Course?

First, get rid of the notion that you will learn all you need to know during the six hours of lecture each week. Educators have estimated that for every hour of in-class lecture time, you should spend 2-3 hours of time out of class. That is probably about right because you are responsible for your own learning and understanding. We cannot learn the information and understand the concepts for you and we cannot make you learn and understand simply through lecture. So the question becomes, how can you most profitably spend these hours outside class? The following list summarizes some strategies I have used as a student and that other students have shared with me.

1. **Read the textbook before class.** Read it through once to identify the "big ideas". Don't highlight every line (this is painting, not studying). Select key concepts and definitions. Keep the textbook closed during lecture unless otherwise instructed.
2. **Go over your lecture notes after each class**. Use the text to fill in missed details and answer questions that you have. But if a question still persists after you have tried to answer it yourself - ASK YOUR INSTRUCTOR. Stop by my office

or email me. Each class builds on information in preceding classes. If a key concept is missed early on, new information will be confusing. Most importantly, organize the material for yourself in terms of importance. It is critical that you know the difference between the large concepts and fine detail of what you are studying, otherwise the semester becomes nothing more than a long boring series of "facts" with no connections.

3. **Work the problems at the ends of the chapters**. Review the chapter objectives online that are provided by the instructor. Some of these WILL appear on the exams.

4. **Study Resources: Freeman Biology Mastering Biology Website**.

5. **Organize a study group**. Ask questions of one another. Try to figure out what questions we might ask on an exam. Analyze each answer as a group and work together to arrive at complete and accurate answers to the questions. Most importantly, take turns TEACHING TO one another. Studies show the best way to learn for most people is to teach the material.

Course Policies:

Discussion:

- The Discussion/Participation portion accounts for one of the 4 credits earned in BIOL 141 and the ***number of points you can earn during the discussion portion (75 pts)*** *will comprise* ***15% of your final course grade***. Your discussion score will be assessed by your overall performance on **study question homework, activity participation, and attendance** by your instructor and TA. There will be ***no make-up for these activities/assessments!***

Missed exam policy:

Make-up Exams: Basically *there aren't any*. All exams must be taken on the date and time they are scheduled. Hour exams will be administered during regular class time or online in blackboard. *Check your calendar* ***NOW*** *to make sure there are no conflicts*.

Make-up exams will NOT be given for missed hour exams unless you have a documented excusable absence. If an hour exam is missed due to a **documented medical emergency** (i.e., *you must be able to provide an* ***official written document****, signed and dated, from a physician or hospital which will be verified*), a make-up essay exam may be given within one class date after the date of the missed exam. To be eligible for an essay make-up exam, either myself, or the Biology Department Office (410-455-2261) ***must be notified in advance, 2 hours or more prior to the time of the exam you will be missing***.

A Comprehensive Final Exam covering the entire semester will be administered on **Friday, July 6, 2012, from 9:00 AM– 11:50 AM.** ***NO MAKE-UP EXAM WILL BE PERMITTED FOR THE FINAL EXAM****, AND* ***NO ONE WILL BE ALLOWED TO TAKE THE FINAL ON A DIFFERENT DAY.***

How to Contest Grading:
If you believe something on an exam or quiz was graded incorrectly (or input incorrectly into Blackboard's Grade Center), you have **one week** after you receive the graded document to provide factual written rebuttal to Professor Schreier, explaining why you think you deserve credit for your work. ***Oral arguments will not be entertained because of time constraints***. Written comments **will not be accepted** on the day a graded item is returned to allow you time to collect your thoughts. I will require the original to be submitted with your rebuttal to ascertain the validity of your argument. Student *rebuttal based on perceived unfairness will be returned to the student with no credit restored*. All comments will be handled without prejudice.

Academic Integrity: According to the Provost of UMBC, **"Each of us has an obligation to act with integrity in our scholarship and general academic work. This is an obligation to ourselves, our colleagues, and the UMBC community."** This statement reflects UMBC's unequivocal goal to establish and maintain a community of scholars who share an ongoing commitment to honesty and integrity in academic and scholarly life and work. Consistent with this strong commitment, any evidence of cheating or plagiarism (representing someone else's work as your own, or enabling another student to represent as his or her work the work of someone else) will be dealt with firmly under the Student Academic Conduct Policy (for a complete statement of the policy go to http://www.umbc.edu/integrity/students.html and click on "UMBC Undergraduate Student Academic Conduct Policy").

If you are observed or reported to be cheating during an examination or quiz, (1) your exam and answer sheet (or quiz) will be **confiscated**, (2) you will receive a score of **zero** for the exam or quiz and (3) you will be reported to the **Academic Conduct Committee.** In the case of a second infraction the Chair of the Academic conduct Committee will be consulted regarding a more severe penalty, including but not limited to a **grade of "F" in the class**, and both the first and second infractions will automatically be reported to the Provost to be reviewed for possible administrative action such as suspension or expulsion. This *policy on cheating will apply to all examinations, quizzes and activities in this course*.

By enrolling in this course, each student assumes the responsibilities of an active participant in UMBC's scholarly community in which everyone's academic work and behavior are held to the highest standards of honesty. ***Cheating, fabrication, plagiarism, and helping others to commit these acts are all forms of academic dishonesty****, and* ***they are wrong****. Academic misconduct identified in this class* ***will result in disciplinary action*** *that may include, but is not limited to, suspension or dismissal. To read the full Student Academic Conduct Policy, consult the UMBC Student Handbook, the Faculty Handbook, or the UMBC Policies section of the UMBC Directory, or go to* http://www.umbc.edu/integrity/ACC_final.pdf

Cell Phone Policy: Students are expected to **turn off their cell phones before they enter the classroom.**

Laptop Computer Use Policy: ***Students are not allowed to use laptop computers in class for any reason whatsoever unless it is part of an instructional activity.***

Exception: Only students with a documented disabilities waiver – i.e., a formal, written letter from Student Support Services that documents the need for the student to use an in-class, laptop computer to take notes – will be allowed to use a laptop computer in the lecture hall. Any other laptop use (i.e., playing solitaire, gaming of any type, IMing with or without multiple windows open, emailing your best bud, watching a movie, etc.) is distracting to students sitting nearby and disrupts the learning environment that we try to maintain in the classroom.

There will be **no other exceptions** to the ban on computer use in BIOL 141.