Syllabus
Bio 110 – Introduction to Biology - Fall 2015

Instructor: Jeffrey D. Newman **Room**: Heim 107 **Phone**: 570-321-4386 **email**: newman@lycoming.edu **office hours**: Mon, Thurs 11-12 PM	**Lecture** meets in Heim G-11 MWF 8:00 – 8:50 **Lab** meets in Heim 111 - Tues. 8:45 -11:35 AM or 1 - 3:50 PM **Course web site:** http://moodle.lycoming.edu Enrollment key = cells

Catalog Description of Course: An introduction to the study of biology designed for students planning to major in the sciences. Major topics considered include a survey of Biochemistry, Cell Biology, Genetics, Development and Evolution.

Text: Custom-text containing the **first half** of Brooker's General Biology text. **(Brooker R.J., Widmaier E.P., Graham L.E., and Stilling P.D. Biology. 3rd ed. McGraw-Hill Higher Education Publishers, 2014)** If preferred one may purchase or rent the entire text, however, students should be aware that Bio111 uses a different text.

.

Learning Goals:

Institutional Student Learning Outcomes addressed in this course include

- intellectual breadth through the study of natural sciences.
- communication effectively in both written and oral forms
- ability to think critically
- demonstration of information literacy skills and technological competence appropriate for his/her discipline

Content Knowledge: Students should understand

- General structure and function of biologically significant molecules and macromolecular assemblies.
- Basic structure and function of intracellular organelles
- Basic cellular processes such as cellular information flow, signaling, protein sorting, metabolic pathways, cell cycle
- Mendelian inheritance of traits/alleles
- Applications of modern biological knowledge such as Biotechnology
- Fundamental aspects of organismal development
- Basic micro and macro-evolutionary concepts

Skills: Students should be able to:

- Generate questions and devise appropriate experiments to address questions
- Use instruments such as spectrophotometers, microscopes, electrophoresis apparati, centrifuges and pipettors in the conduct of experiments.
- Use computers and mathematics to analyze experimental data.
- Report experimental results in an appropriate scientific format.

Course Learning Objectives as related to Biology Dept. Learning Objectives

1. Exhibit proficiency in Biology
2. Perform laboratory techniques as appropriate to Biology
3. Understand and use modern biological instrumentation
4. Exhibit ability to work as an individual and in groups
5. Exhibit integrative, problem-solving skills, such as experimental design, quality assurance/quality control in data collection, data manipulation, and data interpretation.
6. Communicate the results of biological investigation effectively in written form.
7. Search the biological literature and/or databases, evaluate the results of the search, access desired research materials, and perform critical analysis of the data therein.
8. Demonstrate responsible conduct in the laboratory, including laboratory safety and ethical research practices.

Grades will be determined based on the following assessments:

Mid Term Exams	3 x 100 pts = 400 pts
Final Exam	150 pts
Daily Prep papers or "clicker quizzes"	33 x 3 pts + 1 = 100 pts
Lab Quizzes (2 Lowest Dropped)	10 x 10 pts = 100 pts
Phosphatase Data Analysis	50 pts
DNA Lab Data Analysis	50 pts
Participation/Problem Sets	50 pts
Research Project Lab Report	100 pts
Lab Practical	100 pts
Total possible	**1000 pts**

Grading Scale

	B+ = 86.7 - 89.9%	C+ = 76.7 – 79.9%	D+ = 66.7 - 69.9%	
A = 93.3 – 100%	B = 83.3 – 86.6%	C = 73.3 – 76.6%	D = 63.3 – 66.6%	F= below 60%
A- = 90.0 – 93.2%	B- = 80.0 – 83.2%	C- = 70.0 – 73.2%	D- = 60.0 – 63.2%	

Exams will include multiple choice, short answer, problem solving and essay questions.

Final exam will include the following 30 pt comprehensive question,

"Discuss hemoglobin as it relates to each topic discussed in this course. Be sure to include a thorough description of its gene organization, synthesis (beginning at the DNA level), structure, function, regulation, location, allelic variants and the relationship of these alleles to genetic disorders, resistance to infectious disease, and the microevolutionary implications of these variants. How has hemoglobin evolved? What organisms have hemoglobin? What other proteins are related to hemoglobin? What variants are produced at different stages of mammalian development? How is this controlled? What is the significance of these variants?"

Makeup exams, labs: Makeup exams will only be scheduled if the student has a documented medical excuse, religious conflict, family tragedy, or College-sanctioned event that prevents the

student from being present on the scheduled day of the exam or presentation. Medical excuses will require the student to provide a written, dated notice from a physician explaining the student's absence from the scheduled exam ***on the next class day after the absence***.

Policy on cheating and plagiarism:

From the Lycoming College Academic Catalog: The College assumes that students are committed to the principle of academic honesty. Students who fail to honor this commitment are subject to dismissal. Procedural guidelines and rules for the adjudication of cases of academic dishonesty are printed in *The Student Handbook.*

Attendance policy: Attendance of lectures is expected and is in your best interest, because a significant percentage of material on exams will be based on classroom discussions and subjects not covered in the text. Four unexcused absences will result in a warning; if a fifth unexcused absence occurs, the Freshman Dean will be notified.

As Biology is a laboratory science, **attendance of Lab sections is essential**. Quizzes are given during the first 15 minutes of lab, and no make-up quizzes will be given.

Class preparation & participation:

There will be multiple opportunities to contribute to the success of the class this semester, such as asking questions, answering questions, brainstorming sessions or problem solving activities.

Daily Prep "Clicker Quizzes" (bonus pts may be earned for >100 clicker quiz points)

In class this year, we will be using "Student Response Systems" or clickers, Each student will register their clicker code number at the beginning of the semester. At the beginning of each class, there will be three clicker questions reviewing the previous day's class material two questions regarding the reading assignment for that day.

- A score of 4 or 5 correct earns 3 points
- A score of 2 or 3 correct earns 2 points
- A score of 0 or 1 correct earns 1 point (for attendance)

If a student has an **excused** absence **(with proper documentation)**, or is late for class or has forgotten their clicker (up to 2 times), a "prep paper" may be submitted via email within 24 hrs of the class to replace the points for the missed Clicker Quiz.

Prep Paper Guidelines:

Name and class meeting date should be indicated on top of page

- 1 paragraph summarizing key points from previous class
- 1 paragraph summarizing key points from reading assignment
- 0.5 – 1 page single spaced

Students with Disabilities:

Lycoming College provides academic support for students who officially disclose diagnosed learning, physical, and psychological disabilities. If you have a diagnosed disability and would like to seek accommodations, please contact Jilliane Bolt-Michewicz, Assistant Dean of Academic Services/Director of the Academic Resource Center. Dean Bolt-Michewicz will help you arrange for appropriate academic accommodations. She can be reached by calling (570) 321-4050, emailing michewicz@lycoming.edu, or visiting her office (Academic Resource Center, 3rd Floor of Snowden Library).

Tips for success

- Being a college student is a full time job! You should expect to put in 12-14 hours/week for this class. There are 5.5 scheduled hours, so you should work on Bio110 for 6-8 additional hours each week. Most of this time will be spent reading and taking notes from the text and lab manual, reviewing/studying notes, using online resources, working on lab data analysis or lab reports.
- Come to class prepared, knowing what we will discuss. The night before class, review the previous lecture, read new text assignment, Download and print PowerPoint slides if desired.
- Take thorough, well organized notes. That night, review notes, develop questions.
- Bring text, or printed slides (or tablet PC!) to class to write notes on figures.
- Make friends with classmates to study together, encourage and help each other, discuss science, hang out in Heim. I always have coffee prepared!
- Ask questions if you don't understand something.
- Attend the Study Group sessions regularly from the beginning of the course
- **If you feel you are falling behind in the class—get help right away.**
    - **Office Hours**
    - **Study Groups**
    - **Free tutors available from the Academic Resource Center**

Tentative Schedule

Week	**Topics** (chapters)	**Lab Experiments**
Week 1 8/24-28	Course introduction, Chemical Basis of Life (1,2,3)	1. Intro to the Scientific Method, Scientific Writing, **Biology dept. pre-test**
Week 2 8/31-9/4	Organic Molecules, Intro to Cells, and Membranes (3,5,4)	2. Molecular structure and function analysis (computer lab)
Week 3 9/7-11	Membranes, Systems Biology of Cells (5,6) **Exam 1 (9/11)**	3. Microscopic Examination of Cell Structure
Week 4 9/14-18	Enzymes, Metabolism and Respiration, Photosynthesis (7,8)	4a. Measurement of Enzyme Activity (protein extraction)
Week 5 9/21-25	Cell Communication (9) Multicellularity (10)	4b. Measurement of Enzyme Activity (effect of enzyme, substrate conc.)
Week 6 9/28-10/2	Introduction to DNA **(11)** **Exam 2 (10/2)**	4c. Kinetic Analysis of Enzyme Activity
Week 7 10/5-9	Gene expression, regulation (12, 13)	5a. Mr. Green Genes—DNA Sequence analysis & overview of experiment, (computer lab)
Week 8 10/12-14	Bacterial genetics, Genomics, Biotech (parts of 18, 20, 21) **No class Friday—Long Weekend**	5b. Mr. Green Genes—DNA Isolation, Bacterial Transformation
Week 9 10/19-23	Mutation and DNA repair, Chromosomes, Mitosis, and Meiosis, Inheritance (14,15,16)	5c. Mr. Green Genes—Transformation Results, Gel Electrophoresis
Week 10 10/26-30	Simple and complex inheritance patterns, (16, 17) ; **Exam 3 (10/28)**	6. Mitosis/Meiosis/Human Karyotyping 7. Scientific Literature - Research Topics for Team Investigation
Week 11 11/2-6	Eukaryotic Biotech & Genomics **Research Proposal, Materials List due 11/6**	8. Human Genomics 9. Biology Databases (computer lab) **Team Investigation Logistics**
Week 12 11/9-13	Developmental genetics (19)	**Team Investigation**
Week 13+ 11/16-23	Origin and history of life, Intro to Evolution, Population Genetics (22-24)	**Lab Practical**
Week 14 11/30-12/4	Origin of species, Taxonomy, Bacteria and Archaea (25- 27)	10. Evolution **Team Investigation Lab Report due**