

<p style="text-align: center;">BIOLOGY 141 – CELL BIOLOGY AND GENETICS COURSE SYLLABUS FALL 2009</p>

Faculty Information: Dr. Amanda Pendleton, Pierce 105, (404) 784 – 4506,
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Office hours: T, Th 1:30 – 3:00, or feel free to make an appointment with me for another time.

Lecture: M, W, F 10:40 – 11:30 Pierce Hall Room 102

Laboratory: W 2:00 – 5:00 Pierce Hall Room 125

Required Texts:

- (1) *Biology*, N.A. Campbell and J.B. Reece, 2008, 8th edition, Benjamin/Cummings Publishing Co., Inc. The optional Study Guide is available on reserve in the library.
- (2) *Practicing Biology*, Heitz, Jean and C. Griffen. Benjamin/Cummings Publishing Co., Inc. 2008. A terrific workbook that is useful alone or in study groups.

Required Lab Text:

- (1) *Investigating Biology*, 6th ed. Morgan, J. G. and M. E. B. Carter. Benjamin/Cummings Publishing Company, Inc. 2008. A customized edition published for BIO 141 is available in the bookstore. *Used lab manuals are not permitted.*

Optional Writing Book:

- (1) *A Student Handbook for Writing in Biology*, Karen Knisely, 2008, 3rd edition, W.H. Freeman and Co. This is a great resource for writing, and is also on reserve in the library.

Web Site:

- (1) *MasteringBiology* provides online study materials (www.masteringbio.com), practice exams, learning activities, and strategies for success. Your text has instructions for accessing the site.

Course Objectives: The purpose of this course is to give you, the student, a firm foundation in the underlying themes of biology, so that you can answer the following **essential questions**:

- * What common structures are found in almost all living things?
- * What common principles and mechanisms govern almost all living things?
- * How did life on Earth become so diverse?
- * What principles and techniques do biologists use to study life and communicate their findings?

These questions may appear simple, but their answers are quite complex, and involve understanding a great deal of detailed information that encompasses multiple themes in biology. Therefore, this course will guide you through understanding and using the following **content**:

- * The biochemical molecules that form a cell and how these molecules govern cell function.
- * The crucial tasks conducted by cells, including the transportation of components across cell membranes and how cells generate energy.
- * The basic mechanisms of cell duplication, and how these are related to the inheritance of biological traits and the processing of genetic information.
- * The study of gene transmission within a population and how genes are responsible for the evolution of a species.
- * How cellular mechanisms drive evolution and diversity in the biological world.

Finally, this course (both lecture and laboratory portions) is designed to teach you to “think, work, and communicate like a scientist” through methods of scientific inquiry and the practice of deductive reasoning. My hope is that upon grasping the fundamental themes of biology in this course, and using them to ask questions and solve problems, you will be well prepared to delve deeper, into more specialized areas of biology.

Biology 141 - Fall 2009 Lecture Schedule
Dr. Amanda Pendleton

Date	Topic	Assigned Reading
W Aug 26	Science as a Way of Knowing	1
F Aug 28	Major themes in Biology	1
M Aug 31	Hierarchies: beginning with living chemistry and water	2,3
W Sep 2	Building biological macromolecules: carbohydrates and lipids	4,5
Th Sep 3	<i>Scientific Literature and Research (Library - Required)</i> 8:00 – 8:45 am and 9:00 – 9:45 am and 3:00 – 4:00 p.m.	
F Sep 4	Proteins and nucleic acids	5
M Sep 7	** Labor Day **	
W Sep 9	Structure and function revealed in cells	6
F Sep 11	Cellular Case Studies	
M Sep 14	Membrane structure and cellular transport	7
W Sep 16	Transport problems	
Th Sep 17	<i>Presentation of Scientific Data – Pierce 125 or 206 (Required)</i> 8:00 - 8:45 am and 9:00 – 9:45 a.m. and 3:00 – 4:00 p.m.	
F Sep 18	Fundamentals of energy transformations: enzymes, ATP and electron carriers	8
M Sep 21	Cellular respiration I - Glycolysis	9
T Sep 22	EXAM I 8:00 - 9:30 a.m. (through membrane transport)	
W Sep 23	Cellular respiration II - Transition and the Krebs Cycle	9
F Sep 25	Cellular respiration III - Chemiosmosis and the Electron Transport System	9
M Sep 28	Review and recapitulation: Accounting Day	
W Sep 30	Homage to photosynthesis	
F Oct 2	Photosynthesis I: the light dependent reactions	10
M Oct 5	Photosynthesis II: the light independent reactions and variations (C4 and CAM)	10
W Oct 7	Cell reproduction: cell cycle, mitosis	12
F Oct 9	Sexual life cycles and meiosis	13
M Oct 12	*** Fall Break***	
W Oct 14	Chromosomal mutations	15 pp. 297-300
Th Oct 15	EXAM II – 8:00 – 9:30 a.m. (through photosynthesis)	
F Oct 16	Mendelian principles; genes and chromosomes	14, 15 pp. 286-288

<u>Date</u>	<u>Topic</u>	<u>Assigned Reading</u>
M Oct 19	Patterns of inheritance	14, pp. 271-280
W Oct 21	Chromosomal theory and linkage	15
F Oct 23	Genetics problems and review	14, 15
	<i>2-3 p.m. and 3-4 p.m., Effective Presentations Workshop - Pierce 206</i>	
<i>(optional)</i>		
M Oct 26	DNA structure	16
W Oct 28	DNA replication	16
F Oct 30	Gene to Protein I: transcription and the genetic code	17
M Nov 2	Gene to Protein II: translation and genetic mutations	17
W Nov 4	Molecular genetics workshop	
F Nov 6	Charles Darwin and development of evolutionary concepts	22
M Nov 9	Evidence for evolution	22,25, pp. 481-495
W Nov 11	Population Genetics and Hardy Weinberg	23
Th Nov 12	EXAM III - 8:00 – 9:30 a.m. (through genetics)	
F Nov 13	Microevolution: genetic drift, gene flow and mutation	23
	<i>Scientific Papers – “Ask the Experts”- 2:00 p.m.</i>	
M Nov 16	Genetic variation and selection	23
W Nov 18	Simulations – Evolution and population genetics	
F Nov 20	Speciation	24, pp. 487-501
	<i>Research papers due in class</i>	
M Nov 23	Evolution of land plants:	29
W, F Nov 25-27	** Thanksgiving Break **	
M Nov 30	Bryophytes and seedless vascular plants	29
W Dec 2	Seed plants: gymnosperms and angiosperms	30
F Dec 4	Evolutionary trends in land plants	
M Dec 7	The Big Themes Revisited	

FINAL EXAMINATION: Thursday, December 10 from 7:00 – 10:00 p.m.

**BIOLOGY 141
LABORATORY SCHEDULE
FALL 2009
DR. ELOISE CARTER
DR. AMANDA PENDLETON**

<u>Date</u>	<u>Lab Topic</u>	<u>Writing Assignment*</u>
Sept. 2	Scientific Investigation	<i>Title page; Introduction; References</i>
9	Microscopes and Cells	Review table+
16	Diffusion and Osmosis	<i>Results; Table; Figure</i>
23	Enzymes	<i>Materials and Methods</i>
30	Cellular Respiration and Fermentation	<i>Title page; Table; Discussion; References</i> (due 10/9 in class)
Oct. 1st (Thurs.)	LAB EXAM (thru enzymes) (7:45 – 9:15 a.m. or 8:15 – 9:45 a.m.)	
Oct. 7	Mitosis; Introduction to Research	Comparison Table+
14	No Lab	
16	<i>Proposals submitted to conference by 8 a.m.</i>	
21	Field Research: Ecology and Evolution on the Outcrops	
28	Microbial Diversity (Bacteriology)	<i>Research papers due in class 11/20</i>
Oct. 29th (Thurs.)	LAB EXAM (Respiration, Mitosis, and outcrops) (7:45 – 9:15 a.m. or 8:15 – 9:45 a.m.)	
Nov. 4	Research Symposium (<i>Technology Rehearsal – Time & Location: TBA</i>)	
11	Molecular Biology	Map+
18	Plant Diversity I & II	
25	***Thanksgiving Break***; No labs	
Dec. 2	Molecular Phylogeny of Plants	<i>Report completed in lab</i>
Dec. 3rd (Thurs.)	LAB EXAM (7:45 – 9:15 a.m. or 8:15 – 9:45 a.m.)	

***Writing assignments are due one week later at the beginning of the lab period, unless otherwise noted.**

***These assignments are *not* turned in for a grade.**

IMPORTANT DATES FOR BIOLOGY 141 (INCLUDES LAB AND OUT OF CLASS SESSIONS)

September:

- 3 *Literature workshop, preliminary references due (required)*
- 9 Title page, Introduction, References due in lab
- 17 *Data presentation workshop (required)*
- 22 Exam I**
- 23 Results, Table, Figure due in lab
- 30 Materials and Methods due in lab

October:

- 1 Lab Exam I**
- 9 Title page, Table, Discussion and references due in class
- 15 Exam II**
- 16 Laboratory research project proposals due on Learnlink by 8 AM
- 23 *Effective presentations workshop (optional, 1 group member must attend)*
- 29 Lab Exam II**

November:

- 4 Research symposium
- 12 Exam III**
- 13 *"Ask the Experts" session*
- 20 Research paper due in class**

December:

- 2 Molecular phylogeny report completed in lab
- 3 Lab Exam III**
- 10 FINAL EXAM**

The instructor reserves the right to make changes to this syllabus as necessary.

EXPECTATIONS, EVALUATION AND TIPS FOR SUCCESS IN BIOLOGY 141

Welcome to Biology 141! The information in this handout and accompanying materials should be read and followed by all students in Cell Biology and Genetics. If you do not understand everything in this handout, you should ask for clarification.

Introductory Biology (141) is designed for students who **plan to major in biology or neuroscience and behavioral biology, attend professional school in a health related field, or have a strong background in biology** and have chosen biology to fulfill their distribution requirements. This may be one of the more difficult courses you will take, demanding that you learn detailed and complex information, organize this information around conceptual themes, and apply your knowledge. This knowledge will be essential to your success in other biology courses, where your competence in basic biology will be assumed. Many of you will be taking examinations to enter graduate or professional schools, and the knowledge you gain here will be required for these tests.

Tips for Success: Biology 141 is an intensive course and requires time and commitment. To perform well in this course, you must manage your time appropriately. You must have a proper study plan, beginning from the first day of class. If you are an average reader, you should spend about 8 hours a week outside class working on this course. The following are some good study habits that will help you succeed:

- * **Keep up with assigned readings.** The readings listed against each lecture in the syllabus must be done BEFORE the lecture. The best overall study approach is to read assignments quickly at first for an overview. Then, read more carefully, jotting down questions or areas of confusion for later checking and review.
- * **Take good notes.** In lecture, I will explain the most significant concepts from your readings. At times, I will present examples that may not be given in your textbook. You are responsible for all of this information.
- * **Connect the lecture notes to your readings.** For the test, you are responsible for information in the textbook as well as the lecture notes. Make sure that you are able to grasp the major concepts thoroughly and in detail. In addition, connect the concepts learned in lecture to the lab exercises.
- * **Ask questions.** If you don't understand something covered in class, ask questions in class, ask questions of your peers, or arrange to meet with me. I welcome your questions, and if you're struggling, it's important to get help early!
- * **Review, review, review.** Any biology course these days will have **a lot** of information. So, the more you review that information, the more likely you are to remember, understand, and master it. I suggest that you study the diagrams in your text and lecture handouts; practice writing out pathways and linking concepts; prepare your own tables and diagrams as a study aid; attend your SI sessions on a regular basis; complete assignments in *Practicing Biology*; and take advantage of my office hours to get individual assistance.
- * **Memorize AND think.** While studying, keep two things in mind: (1) learn terminology and understand the relevance of that terminology to biological function, and (2) this course is designed to make you think and not just memorize facts. Memorizing facts is important to establish a basis for your knowledge, but it is not sufficient. You must be able to use your knowledge to think logically and analytically. Many of the test questions will revolve around applying your knowledge. Therefore you should be confident of what you know and what it means.

- * **Lab is equally important.** The laboratory component of this course is intensive and requires time as well. Please read your lab manual BEFORE lab and pay attention to the details. Take good notes during the lab and take time to make detailed observations. Answer questions in the lab manual either during lab or immediately following lab. After lab, review the objectives and prepare a study guide for the lab materials and activities. Make use of open lab times and prepare in advance for the lab writing assignments, because these assignments are important.

Additionally, the lab topics and activities are designed to reinforce concepts covered in lecture. So, by preparing well for labs and by participating fully in labs, you're likely to also do better in the lecture portion of the course.

Supplemental Instruction (SI) is provided for all students in Biology 141. I will explain this important program that provides assistance for all students who wish to improve their performance in biology. Your Biology 141 SI leaders is Zahra Ali.

Evaluation Criteria:

- ✧ *Examinations* – There will be three lecture exams, each worth 100 points, including multiple choice, short answer and short essay questions. Exams will cover all material in lecture in addition to assigned textbook readings and other supplemental materials. The final examination, worth 175 points, is comprehensive. Three laboratory exams, each worth 50 points, will be given in this course. Each lab exam will cover the material from the lab exercises. The lab exams will include a practical and a written portion.
- ✧ *Scientific Writing and Laboratory Project* – You will write individual sections of a scientific paper for specific laboratory exercises. Students will propose and implement an independent investigation as a team research project. For this laboratory, you will prepare a group symposium presentation and write an individual complete scientific paper. Specific instructions will be provided in lab.
- ✧ *Distribution of Points* –

300 points	3 lecture exams
150 points	3 laboratory exams
175 points	final examination
40 points	scientific writing
60 points	lab project

725 points	total
- ✧ *Final grade determination* –

90 - 100%	A
80 – 89%	B
70 – 79%	C
60 – 69%	D
<60	F

Plus and minus grades are given

Class Policies:

1. **Attendance:** See the attached sheet for the attendance policy. Unexcused absences in lecture, lab, examinations or a failure to follow the procedures outlined in that handout will result in a reduction in your grade. Any questions about absences should be asked immediately. It is your responsibility to be aware of the policy.
2. **Exams:** A student should place all book bags, purses, and other belongings at the front of the room while sitting for any type of exam or graded assignment. Cell phones should be turned off and should be placed in bags or on a bench at the front of the room. (Desktops should be clear except for the materials needed and authorized for testing). Students should feel free to ask for clarification about any question during the exams
3. **Late work:** My due dates are fixed, unless you provide documentation of a serious life event.
4. **Missed exams:** In general, missed exams may not be made up (see the attached sheet for the absence policy). However, if you already know you have a conflict, please inform me before Sept. 7, and I will determine if make-up arrangements will be possible. If you miss an exam, and do not notify me before Sept. 7, the exam cannot be made up, except for serious reasons (such as death or illness) with proper documentation.
5. **Challenging grades:** Any questions about a graded assignment must be submitted, in writing, no later than the following class period after the test was returned. I will then regrade the entire assignment; therefore, a student's grade could increase, stay the same, or decrease.
6. **Electronic devices:** Please turn off all cell phones and other electronic devices prior to entering the classroom.
7. **Academic dishonesty:** Honesty and ethical behaviors are imperatives in any career. Therefore, academic dishonesty will not be tolerated. See http://oxford.emory.edu/audiences/faculty_and_staff/resource_policies/faculty_handbook/honor_code.dot for descriptions of what constitutes academic dishonesty. Regulations of the Honor Code apply to all work for credit in this course, including lecture and lab examinations. Please pledge all of your work with your signature to indicate that you have followed the rules of the Honor Code. Anyone caught violating this policy will be reported to the Honor Council, as detailed in the Honor Code. If you have any questions about what constitutes your own work, definitely ask!