

Biology 141 Cell Biology and Genetics
Syllabus
Fall Semester 2006

Professor: Dr. M. Eloise Brown Carter
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Lecture Hours: Monday, Wednesday, Friday 11:45 a.m. – 12:35 p.m.
Room: Pierce 102
Lab Hours: Tuesday 2:30 – 5:30 p.m. **Room:** Pierce 125

Office Hours: Tuesday, 1:00 – 2:00 p.m. and Wednesday - 12:45 to 1:30 p.m. Join Dr. Carter for “Walk and Talk” on the Quad during nice weather each Wednesday. Students are encouraged to see Dr. Carter during class to make appointments for other times.

Required Text: *Biology*, N.A. Campbell and J.B. Reece, 2005, 7th edition, Benjamin/Cummings Publishing Co., Inc. The optional Study Guide is available on reserve in the library.

Required Lab Text: *Investigating Biology*, 5th ed. Morgan, J. G. and M. E. B. Carter. Benjamin/Cummings Publishing Company, Inc. 2005. *Used lab manuals are not permitted.*

Optional Writing Book: *A Student Handbook for Writing in Biology*, Karen Knisely, 2005, 2nd edition, W.H. Freeman and Co. This is a great resource for writing, and is on reserve in the library.

Optional Supplements: *A Guide to Biology Lab*, Rust, T.G., Southwest Educational

Practicing Biology, Heitz, Jean. Benjamin/Cummings Publishing Co., Inc. 2005. A terrific workbook that is useful alone or in study groups. Some materials used in SI.

Date	Topic	Assigned Reading
W, Aug 30	Science as a Way of Knowing	1
F, Sep 1	Major themes in Biology	1
M, Sep 4	** Labor Day **	
W, Sept 6	Hierarchies: beginning with living chemistry and water	2,3
Thurs., Sep 7	<i>Scientific Literature and Research (Library - Required)</i> 8:15 – 9:30 am and 9:30 – 10:45 am	
F, Sep 8	Building biological macromolecules: carbohydrates and lipids	4,5
M, Sep 11	Proteins and nucleic acids	5
W, Sep 13	Structure and function revealed in cells	6
F, Sep 15	Cellular Case Studies	

M, Sep 18	Membrane structure and cellular transport	7
W, Sep 20	Transport problems	
Thurs., Sep 21 st	<i>Presentation of Scientific Data – Pierce 123 (Required)</i> <i>8:30 - 9:30 am and 9:30 – 10:30 a.m.</i>	
F, Sep 22	Fundamentals of energy transformations: enzymes, ATP and electron carriers	8
M, Sep 25	Cellular respiration I - Glycolysis	9
Tues, Sep 26	EXAM I 8:00 - 9:30 a.m. (through membrane transport)	
W, Sep 27	Cellular respiration II - Transition and the Krebs Cycle	9
F, Sep 29	Cellular respiration III - Chemiosmosis and the Electron Transport System	9
M, Oct 2	Review and recapitulation: Accounting Day	
W, Oct 4	Homage to photosynthesis;	
F, Oct 6	Photosynthesis I: the light dependent reactions	10
M, Oct 9	** Fall Break **	
W, Oct 11	Photosynthesis II: the light independent reactions and variations (C4 and CAM)	10
F, Oct 13	Cell reproduction: cell cycle, mitosis	12
M, Oct 16	Sexual life cycles and meiosis	13
Tues, Oct 17	EXAM II – 8:00 – 9:30 a.m. (through photosynthesis)	
W, Oct 18	Chromosomal mutations	13, 15 pp. 285-288
F, Oct 20	Mendelian principles; genes and chromosomes	14, 15 pp. 274-275
M, Oct 23	Patterns of inheritance	14, pp. 260-270
W, Oct 25	Chromosomal theory and linkage	14
F, Oct 27	Genetics problems and review	15, pp. 276-285
M, Oct 30	DNA structure	16
W, Nov 1	DNA replication	16
F, Nov 3	Gene to Protein I: transcription and the genetic code <i>2-3 p.m., Power Point Workshop - Pierce 206 (optional)</i>	17
M, Nov 6	Gene to Protein II: translation and genetic mutations	17
W, Nov 8	Molecular genetics workshop	
F, Nov 10	Charles Darwin and development of evolutionary concepts	22
M, Nov 13	Evidence for evolution	22,25, pp. 481-495
W, Nov 15	Population Genetics and Hardy Weinberg	23
Thurs, Nov 16	EXAM III - 8:00 – 9:30 a.m. (through genetics)	
F, Nov 17	Microevolution: genetic drift, gene flow and mutation <i>Writing Workshop 2:00 p.m. Library</i>	23

M, Nov 20	Genetic variation and selection	23
W, F 22-24	** Thanksgiving Break **	
M, Nov 27	Simulations – Evolution and population genetics	
	<i>Research papers due in class</i>	
W, Nov 29	Speciation	24, pp. 472-480
F, Dec 1	Evolution of land plants:	29
M, Dec 4	Bryophytes and seedless vascular plants	29
W, Dec 6	Seed plants: gymnosperms and angiosperms	30
F, Dec 8	Evolutionary trends in land plants	
M, Dec 11	The Big Themes Revisited	

***** FINAL EXAMINATION *** Thursday, December 18, 2:00 – 5:00 pm *****

**BIOLOGY 141
LABORATORY SCHEDULE
Fall 2006
Dr. Eloise Carter**

<u>Date</u>	<u>Lab Topic (#)</u>	<u>Writing Assignment</u>
Sept. 5,6	Scientific Investigation (1)	Title page; Introduction; References (<i>due in class on 9/15</i>)
12,13	Microscopes and Cells (3)	Review table+
19,20	Diffusion and Osmosis (4)	Table; Figures; Results; (<i>due in class 9/29</i>)
26,27	Enzymes (2)	Title page; materials & methods (<i>due in class on 10/6</i>)
Oct. 3rd (Tues.)	LAB EXAM (1,2,3,4) (8:15 – 9:30 a.m. or 9:30 – 10:45 a.m.)	
3,4	Cellular respiration (5)	Table; Figures; Discussion; References (<i>due in class on 10/13</i>)
10	***Fall Break***	
11,12	Meet in research groups Tuesday lab section see instructor	Proposal <i>due 10/11 or 10/12</i>
17,18	Field Trip: Ecology and Evolution on the Outcrops	
24,25	Mitosis and Meiosis (7)	Comparison table+
Oct. 31st (Tues.)	LAB EXAM (5, 7, and outcrops) (8:15 – 9:20 a.m. or 9:30 – 10:45 a.m.)	
Oct. 31, Nov. 1	Microbial Diversity (13)	<i>Research papers due in class 11/27</i>
7,8	Research Symposium (<i>Technology Rehearsal - 9 a.m. Pierce 102</i>)	
Nov. 14,15	Molecular Biology (10)	Map+
21,22	***Thanksgiving Break***	

<u>Date</u>	<u>Lab Topic (#)</u>	<u>Writing Assignment</u>
28,29	Plant Diversity I & II (15, 16)	
Dec. 5,6	Molecular Phylogeny	Report
Dec. 7th (Thurs.) LAB EXAM (10, 13, 15, 16) (8:30 – 9:30 a.m. or 9:30 – 10:30 a.m.)		

+These assignments are not turned in for a grade.

STUDENT'S GUIDE TO BIOLOGY 141






Welcome to Biology 141! The information in this handout and accompanying materials should be read and followed by all students in Introductory Biology. 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**, 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 not only learn and apply complex information, but that you also organize this information within the major concepts of biology. This information will be essential to your success in other biology courses, where your competence in basic biology will be assumed. In addition many of you will be taking examinations to enter graduate or professional schools, and the knowledge you gain here will be required later.

Course Objectives. In Biology 141 students are introduced to basic concepts in biology following the hierarchy of life from basic biological molecules, to cell structure and function, fundamentals of genetics, evolution and organismal diversity (specifically plants). Students master detailed information within the broad themes of unity and diversity, structure and function, and evolution.

The laboratory component of the course emphasizes student use of scientific methods of inquiry, fundamental concepts and techniques in biology, and communicating scientific results through laboratory presentations and scientific writing. Students participate in an independent team research project: proposal, research, symposium and scientific paper.

Tips for Studying: Biology 141 is an intensive course and requires time. If you are an average reader, you should spend about 8 hours a week outside class working in BIO 141. To perform well in this course, you must be diligent about the following:

-  *Keep up with assigned readings.* The readings listed for each lecture in the syllabus must be done BEFORE the lecture. The best overall study **approach is to read assignments over 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.
-  *Study the diagrams in your text and lecture handouts.* Practice writing out pathways and link the concepts. It is helpful to **prepare your own tables and diagrams** as a study aid and review for much of the material in BIO 141.
-  *Memorize and think.* While studying, keep two things in mind: One is to **learn terminology** and most importantly, understand the relevance of that terminology to biological function. Second – it is crucial to remember that this course is designed

to make you **think** and not just to have you memorize facts. Many of the test questions will revolve around applying your knowledge. Therefore you should be confident of what you know and what it means.



Be an active learner. Develop study guides, comparison charts, concept maps (see Study Guide). Use the CD Study Guide and web resources for your textbook. Attend Supplemental Instruction and organize an active study group. **Don't be lulled into thinking familiarity is the same as knowledge.** The latter takes hard work!



Be prepared for laboratory and invest time and effort in lab each week. Read the lab and review terminology and diagrams before lab each week. During lab complete all components of the lab. After lab review the objectives, answer all questions and prepare a study guide for the lab materials.

Supplemental Instruction. is provided for all students in BIO 141. The instructor will explain this important program that provides assistance for all students who wish to improve their performance in biology.

Examinations. The lecture exams will be a combination of multiple choice, short answer and short essay questions. Exams will cover all material covered in lecture in addition to assigned readings in the text. The final examination is comprehensive. Students should feel free to ask for clarification about any question during the exams.

Scientific Writing and Laboratory Project. Students will write two sections of a scientific paper for two laboratory exercises. Students will propose and implement an independent investigation as a research project. For this laboratory, they will prepare a symposium presentation and write a complete scientific paper. Specific instructions will be provided in lab.

Honor Code. All examinations and work for credit in this course come under the regulations of the Honor Code. Your signature on your work attests to your upholding the Honor Code.

Absences. The policy on absences is provided in a separate handout. Unexcused absences 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.

Evaluation. Students are evaluated on their performance in the classroom and laboratory. The assignment of points will be:

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.	