

Biology 141 Cell Biology and Genetics
Syllabus
Fall Semester 2005

Professor: Dr. M. Eloise Brown Carter

Office: Pierce Hall #105

Phone: (770)784-8343

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 for sale in the bookstore and is on reserve in the library.

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.

Required Lab Text: *Investigating Biology*, 5th ed. Morgan, J. G. and M. E. B. Carter. Benjamin/Cummings Publishing Company, Inc. 2002. *Used lab manuals may not be used.* **Optional Lab Supplement:** Rust, T.G., *A Guide to Biology Lab*, Southwest Educational Ent.

			Chapters
Aug. 31	Science as a Way of Knowing		1
Sept. 2	Major themes in Biology		1
5	** Labor Day **		
7	Hierarchies: beginning with living chemistry and water		2,3
9	Building biological macromolecules: carbohydrates and lipids		4,5
12	Proteins and nucleic acids		5
13 th	8:15-9:30 am <i>Scientific Literature and Research (Library)</i>		
14	Structure and function revealed in cells		6
15 th	8:15 – 9:30 am <i>Scientific Literature and Research (Library)</i> and 9:30 – 10:45 am		
16	Cellular Case Studies		

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

14	Evidence for evolution	22,25, pp. 481-495
15(Tues)	EXAM III - 8:00 - 9:30 a.m. (through genetics)	
16	Population Genetics and Hardy Weinberg	23
18	Microevolution: genetic drift, gene flow and mutation	23
21	Genetic variation and selection	23
23-25	** Thanksgiving Break **	
28	Case Study - Evolution and population genetics	
30	Speciation	24, pp. 472-480
Dec. 2	Evolution of land plants:	29
5	Bryophytes and seedless vascular plants	29
7	Seed plants: gymnosperms and angiosperms	30
9	Evolutionary trends in land plants	
12	The Big Themes Revisited	

***** FINAL EXAMINATION*****

BIOLOGY 141
LABORATORY SCHEDULE
Fall 2005
Dr. Eloise Carter

<u>Date</u>	<u>Lab Topic (#)</u>	<u>Writing Assignment</u>
Sept. 6,7,8	Scientific Investigation (1)	Title page; Introduction; Materials and Methods; References (due in lab 20,21,22)
13,14,15	Microscopes and Cells (3)	Review table+
20,21,22	Diffusion and Osmosis (4)	Title; Results; Discussion; References (due in class 9/30)
27,28,29	Cellular respiration (5)	Proposal due 9/23, all sections
Oct. 4th (Tues.)	LAB EXAM (1,3,4) (8:15 – 9:30 a.m. or 9:30 – 10:45 a.m.)	
4,5,6	Ecology and Evolution on the Outcrops	Field Trip
11	***Fall Break***	
12,13	Students will complete bacterial isolation during open lab (2-5pm) on 12 th and 13 th – sign up with instructor.	
18,19,20	Mitosis and Meiosis (7)	Comparison table+
25,26,27	Research Symposium Technology Rehearsal 9 a.m. Pierce 102	Optional Rough drafts of Results and Discussion sections
Nov. 1st (Tues.)	LAB EXAM (5, 7, and outcrops) (8:15 – 9:20 a.m. or 9:30 – 10:45 a.m.)	
1,2,3	Microbial Diversity (13)	Report
7	<i>Final Research Papers due in class</i>	
8,9,10	Molecular Biology (10)	Map
15,16,17	Population Genetics I (11)	
22,23,24	***Thanksgiving Break***	

29,30,31 Plant Diversity I & II (15, 16)

Dec. 6th (Tues.) LAB EXAM (9, 11, 15, 16) (8:30 – 9:30 a.m. or 9:30 – 10:30 a.m.)

6,7,8 Molecular Phylogeny Report

⁺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.

08/05