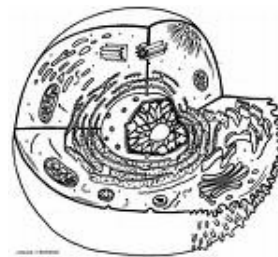


# ***Biology 141 Cell Biology and Genetics***

## ***Syllabus***

***Spring Semester 2007***



**Professor:** Dr. Steve Baker

**Office:** Pierce Hall #117A

**Lecture Hours:** 09A: MWF, 9:35-10:25

11A: MWF, 11:45 – 12:35

Both sections meet in Pierce 101

**Office Hours:** Tuesday 9:30-11:00, Wednesday 2:00-3:00, or by appointment...

see me after class or email to set up. You are welcome to talk to me anytime if I am in the office or lab.

**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, 2<sup>nd</sup> 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*, 5<sup>th</sup> 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.

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			Chapters
Jan.	17	Science as a Way of Knowing	1
	19	Major themes in Biology	1
	22	Hierarchies: beginning with living chemistry and water	2,3
	23	(Mon lab), 25 <sup>th</sup> (Wed lab), 8:15-9:30 am, Scientific Literature and Research (Library)	
	24	Building biological macromolecules: carbohydrates and lipids	4,5
	26	Proteins and nucleic acids	5
	29	Structure and function revealed in cells	6

	31	Cellular Case Studies	
Feb.	2	Membrane structure and cellular transport	7
	5	Transport problems	
	7	Fundamentals of energy transformations: enzymes, ATP and electron carriers	8
	8 (Tues.)	<b>EXAM I 8:00 - 9:30 a.m. (through membrane transport</b>	
	9	<i>Presentation of Scientific Data – Pierce 206 or lab (Required)</i> <i>Discussion of Research Projects</i>	
	12	Cellular respiration I - Glycolysis	9
	14	Cellular respiration II - Transition and the Krebs Cycle	9
	16	Cellular respiration III - Chemiosmosis and the Electron Transport System	9
	19	Review and recapitulation: Accounting Day	
	21	Homage to photosynthesis;	
	23	Photosynthesis I: the light dependent reactions	10
	26	Photosynthesis II: the light independent reactions and variations (C4 and CAM)	10
	28	Cell reproduction: cell cycle, mitosis	12
March	3	Sexual life cycles and meiosis	13
	5	Chromosomal mutations	13, 15 pp. 285-288
	7	Mendelian principles; genes and chromosomes	14, 15 pp. 274-275
	8(Thur.)	<b>EXAM II - 8:00 - 9:30 a.m. (through photosynthesis)</b>	
	9	Patterns of inheritance	14, pp. 260-270
	<b>12-16</b>	<b>SPRING BREAK!</b>	
	19	Chromosomal theory and linkage	14

21	Genetics problems and review	15, pp. 276-285
23	DNA structure	16
23	Powerpoint workshop, time and location TBA	
26	DNA replication	16
28	Gene to Protein I: transcription and the genetic code	17
30	Gene to Protein II: translation and genetic mutations	17
April 2	Molecular genetics workshop	
4	Charles Darwin and development of evolutionary concepts Research Papers due in class	22
6	Evidence for evolution	22,25, pp. 481-495
9	Population Genetics and Hardy Weinberg	23
10(Tues)	<b>EXAM III - 8:00 - 9:30 a.m. (through genetics)</b>	
11	Microevolution: genetic drift, gene flow and mutation, and selection	23
13	Population Genetics I	23 and Lab Topic 11
16	Population Genetics I	23 and Lab Topic 11
18	Speciation	24, pp. 472-480
20	Evolution of land plants:	29
23	Bryophytes and seedless vascular plants	29
25	Seed plants: gymnosperms and angiosperms	30
27	Evolutionary trends in land plants	
April 30	The Big Themes Revisited	

**\*\*\* FINAL EXAMINATION\*\*\***

**Section 09A, Thursday May 3, 2:00-5:00**  
**Section 11A, Tuesday May 8, 9:00-11:00**

**BIOLOGY 141 - LABORATORY SCHEDULE**  
**Spring 2007/ Dr. Steve Baker**

<u>Date</u>	<u>Lab Topic (#)</u>	<u>Writing Assignment</u>
Jan. 22, 23	Scientific Investigation (1)	Title page; Introduction and References ( <i>due in lab on 1/29, 1/30</i> )
29, 30	Microscopes and Cells (3)	Review table <sup>+</sup>
Feb. 5, 6	Diffusion and Osmosis (4)	Results, Figure and Table ( <i>due in lab on 2/12, 2/13</i> )
12,13	Enzymes (2)	Materials and Methods ( <i>due in lab on 2/19, 2/20</i> )
<b>15 (Thurs.)</b>	<b>LAB EXAM (1,2,3,4) (8:15 - 9:30 a.m.)</b>	
19, 20	Photosynthesis (6)	Discussion; References ( <i>due in lab on 2/26, 2/27</i> )
26, 27	Cellular Respiration (5) Research Project	Proposal due 2/21 in class
March 5, 6	Open lab: sign up for 1.5 hour blocks	
<b>***SPRING BREAK***</b>		
12, 13	Mitosis and Meiosis (7)	Comparison table <sup>+</sup>
19,20	Research Symposium	Technology Rehearsal TBA
<b>22 (Thurs)</b>	<b>LAB EXAM (5, 6, 7) (8:15 a.m. – 9:30 a.m.)</b>	
26, 27	Molecular Biology (10)	Map <sup>+</sup>
April 2, 3	Field Trip: Evolution and Ecology On the Outcrops	Research papers due in class
9,10	Microbial Diversity (13)	
16, 17	Plant Diversity I and II: (15, 16)	
<b>19(Thurs.)</b>	<b>LAB EXAM (Outcrops, 13, 15, 16) (8:15 a.m. – 9:30 a.m.)</b>	
23, 24	Molecular Phylogeny	Report

<sup>+</sup>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.* Attend Supplemental Instruction and organize an active study group. Develop study guides, comparison charts, concept maps (see Study Guide). Use the CD Study Guide and web resources for your textbook. **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

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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.

01/07