

## WELCOME TO BIOLOGY 230!

### Philosophy

This is the second course in the core program for Biology majors. When you have completed this course and organic chemistry you will be able to undertake upper division coursework in the biological sciences. Course content, assignments, and lab work are comparable to that of your transfer institution and designed to prepare you for upper division work in the sciences. The basic principles you will study in Cell Biology be applicable in all biology-related professions including medicine, agriculture, biotechnology, animal behavior, and ecology.

More than 50 years ago, Edmund B. Wilson wrote that “*the key to every biological problem must finally be sought in the cell.*” Recent advances in molecular biology techniques have made it possible to look for these answers in the cell and Cell Biology has become the unifying theme for biology and biochemistry. Cell Biology is becoming the organizing theme for much of the first-year medical curriculum as well. On the surface, living organisms appear widely disparate, however they share more similarities than they have differences.

### Goals

After completing this course, you will be able to:

1. Have acquired an understanding of the major concepts in cell biology, and the experimental approaches taken to address them
2. Write clear and well-argued descriptions of these topics, based on the course material and textbook articles
3. Design, perform and analyze experiments in cell biology
4. Continue with upper division coursework in Biology.

### Attendance

Regular attendance is expected at every meeting. Role will be taken during each class meeting. When students must be absent because of illness or emergencies they should contact the instructor in advance. A student may be dropped for missing six class meetings. Responsibility for making up work missed because of absence rests with the student.

Papers are due on the assigned dates, late papers will not be accepted. All tests and quizzes must be taken on the designated days, make-ups will not be given.

### Requirements

All homework, all exams, and one final examination must be taken for a passing grade. All laboratory reports must be completed to earn a passing grade; laboratory will account for approximately 40% of the grade.

GRADING:	A	≥ 88% of points
	B	75-87%
	C	60-74%
	D	45-59%
	F	≤ 45%

Excellent attendance and class participation will be taken into consideration during grading.

### The Grade of W

You may wish to withdraw from this class. If you withdraw prior to 2-17-09 nothing will appear on your record. If you withdraw between 2-17-09 and 4-30-09, a *W* will appear on your transcript. You will receive a *W* for exceeding four absences prior to 4-30-09.

*Anyone exceeding six absences after 4-30-09 will get a final grade of F.*

### Textbooks

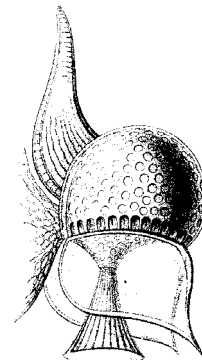
Campbell, N. and J. Reece. *Biology* 8th ed. San Francisco: Benjamin/Cummings.  
Case, C. L. *Laboratory Experiments in Cell Biology*. Skyline College, 2009.

**Study Aids.** Study questions and vocabulary words can be found at the BIOL 230 web site <[skylinecollege.edu/case](http://skylinecollege.edu/case)>. Use these to review for exams.

### Office Hours

Please contact the instructor at any time with questions concerning the course, an assignment, an upcoming quiz, etc.

Office 7214,  
phone: (650) 738-4376,  
email: [case@smccd.edu](mailto:case@smccd.edu)



A dinoflagellate

## LECTURE SCHEDULE

Skim the assigned pages before lecture and then study them for comprehension after lecture.

Lecture #                      Topic                      Reading: Campbell, N. and J. Reece. *Biology*, 8<sup>th</sup> ed.  
San Francisco: Benjamin/Cummings.

1	Introduction	
2	Cell theory	Ch. 1
3	Cell evolution	pp. 507-517
4	Tree of Life	Ch. 26
5	Microscopy	Appendix D
6	Cell structure	Ch. 6
7-9	Membranes	pp. 125-130
10	Transport across membranes	pp. 130-138
	<b>TEST</b>	
12-13	Organic molecules	Ch. 5
14	Energy	pp. 142-151
15-16	Enzymes	pp. 151-159
17	Catabolism	Ch. 9
18	Electron transport chains	pp. 172-176
19-21	Photosynthesis	Ch. 10
22	Anabolism	pp. 180-182
	<b>TEST</b>	
24-25	DNA synthesis	Ch. 16
26-27	Protein synthesis	Ch. 17
28	Control of gene expression	Ch. 18
29	Mutation	pp. 344-346
30	Recombination	p. 435; 561-564
31	Biotechnology	Ch. 20, p. 651
	<b>TEST</b>	
33-34	Ecology	pp. 1231-1242
35-36	Growth	pp. 238-243
37	Development	Ch. 21
38	Cell communication	Ch. 11
39	Cancer	pp. 242-243; 373-377
40-41	Viruses	Ch. 19
42	Immunity	Ch. 43
<b>May 22</b>	<b>FINAL</b>	<b>11:10 AM-1:40 PM</b>

## DATES TO REMEMBER

Assignment	Date due
Bio-surfing* .....	2-6-08
Select a project* .....	2-13-08
Lab notebook* due with draft protocol.....	2-27-08
Journal article* related to your project .....	3-6-08
Lab notebook due with revised protocol + Include Supply Request* page .....	3-13-08
Lab notebook due (midterm reporting).....	4-24-09
All project-related lab work done .....	5-8-09
Project Lab notebook due .....	5-20-09
Paper due (Late papers will not be accepted.).....	5-20-09

## RESEARCH PROJECT

During the semester you will do a **laboratory** research project. Your research project may be done individually or in pairs. If done in pairs, each of you will get the same score.

Points	Format
4	1. General Form: Ten typed, double-spaced pages as described below. The text should consist of student-worded analyses of your research during long hours in a library and in the lab. See the Style Sheet. Attach this page to your report.
6	2. Three figures on <b>three</b> separate pages. <ol style="list-style-type: none"> <li>a. Each figure must be numbered and have a legend.</li> <li>b. Refer to each figure in the body of the text.</li> <li>c. Figures should be graphs of your data, photographs/diagrams of your work; relevant chemical formulas.</li> </ol>
1	3. Content: each of the following must be limited to <b>one</b> page.
4	
3	
10	
10	
10	
10	
12	
5	h. Literature cited. Literature cited page. Include 5 references in correct format. References must be cited somewhere in content. Do not include references prior to 1980.
15	4. <b>Lab notebook:</b> See the guidelines on the BIOL 230 web site.
20	<ol style="list-style-type: none"> <li>a. General format</li> <li>b. Regular lab entries</li> </ol>
100	Total points

<sup>1</sup>Procedures

The activities implemented involved five different experiments (e.g., testing five compounds).

<sup>2</sup>General format

Followed all directions explicitly with no exceptions.

Presentation is neat and orderly throughout.

Spelling and grammar were faultless.

- See BIOL 230 at <[skylinecollege.edu/case](http://skylinecollege.edu/case)> for instructions and further information.



## ***WELCOME TO THE BIOLOGY 230 LABORATORY!***

### **Philosophy**

Laboratory experiments are intended to reinforce basic principles you are learning and to help you develop your problem-solving techniques. Over 200 years ago Jean Baptiste Lamarck said *The most important discoveries of the laws, methods and progress of nature have nearly always sprung from the examination of the smallest objects which she contains*. The lab techniques you will learn here are applicable to all biology-related professions including medicine, agriculture, biotechnology, animal behavior, and ecology.

### **Attendance**

Regular attendance is expected at every meeting. Role will be taken during each class meeting. When students must be absent because of illness or emergencies they should contact the instructor as soon as possible. A student may be dropped for missing two laboratory periods. Responsibility for making up work missed because of absence rests with the student.

### **The Grade of W**

You may wish to withdraw from this class. If you withdraw prior to 2-17-09 nothing will appear on your record. If you withdraw between 2-17-09 and 4-30-09, a *W* will appear on your transcript. You will receive a *W* for exceeding four absences prior to 4-30-09.

*Anyone exceeding six absences after 4-30-09 will get a final grade of F.*

### **Requirements**

All laboratory work must be completed and stamped to earn full credit on a laboratory report. All laboratory reports must be completed to earn a passing grade; laboratory will account for approximately 40% of the grade. Excellent attendance and class participation will be taken into consideration during grading. Late reports will lose 25% of the points per day. Unstamped labs can earn a maximum of 50% of the possible points.

Laboratory reports, 22 x 10 points each = 220 points

### **Textbook—Required**

Case, C. L. *Laboratory Experiments in Cell Biology*. Skyline College, 2009.

### **Open Lab**

The lab is available for use whenever there are no classes scheduled.

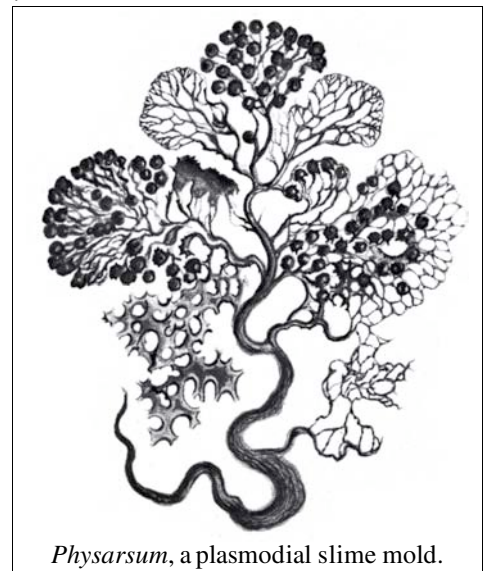
The hours are posted by the door. Use this time to record results of experiments in progress, complete unfinished work, and work on independent projects.

### **Office Hours**

Chris Case: Office 7214, phone: (650) 738-4376, email: case@smccd.edu

### **Lab Techniques**

Keep a record of those techniques you have mastered so you can add them to your resume. The list of lab techniques used in this course is on the BIOL 230 web site.



*Physarum*, a plasmodial slime mold.

### Laboratory Drawer

One lab drawer will be assigned to each pair of students during the first laboratory period. Combination: \_\_\_\_\_ Check your drawer contents against the inventory list. You will be responsible for these materials. Keep them clean and in good condition.

## LABORATORY SCHEDULE

**Read** the assigned lab experiment prior to coming to class. Have your lab report stamped each day, unstamped reports can earn a maximum of 50% of the possible points. Lab reports are due at the next lab following completion of the experiments. Late reports will lose 25% of the points per day.

Tues	Thur	Experiment Title <sup>1,2</sup>	Reading <sup>3</sup>
1-20	1-22	Cell Behavior and Slime Molds Fern Development Lab Safety, pp. v-vi Lab check-in	p. 99 (Fig. 6.8), 594-596 pp. 610-611
1-27	1-29	Cell Structure and Microscopy <i>How are your ferns doing?</i>	Ch. 6
2-3	2-5	Tissue Printing Muscle Cells	pp. 746-750 pp. 1066-1072
2-10	2-12	Biologically Important Organic Molecules Gel Filtration	Ch. 5 Fig. 5.8
2-17	2-19	Diffusion and Osmosis <i>How are your ferns doing?</i>	pp. 132-135
2-24	2-26	<i>Read about Aseptic Techniques on the BIOL 230 web site.</i> Genetic Engineering of Plants	pp. 412-415, 421, 814-815
3-3	3-5	Membrane Receptors <i>Fern Development due</i> <i>You should be starting your research.</i>	p. 130
3-10	3-12	Lactate Dehydrogenase Isoenzymes Cellular Metabolism	Fig. 9.18b Ch. 9
3-17	3-19	Enzyme Kinetics	Ch. 8
3-24	3-26	Photosynthesis	Ch. 10
3-31	4-2	Mitochondria Bioremediation	pp. 170-172 p. 420, 572, 1260-1261
4-21	4-22	Industrial Fermentation <i>Transfer clones</i>	Fig. 53.11, 53.13
4-28	4-30	Isolation of DNA DNA fingerprinting <i>Bioremediation due</i>	Fig. 16.21 pp. 416-417, 405
5-5	5-7	Transformation <i>Genetic Engineering of Plants due</i>	pp. 396-399
5-12	5-14	Polymerase Chain Reaction Lab check-out	pp. 403-404

<sup>1</sup> Case, C. L. *Laboratory Experiments in Cell Biology*. Skyline College, 2009.

<sup>2</sup> See the BIOL 230 web site for helpful hints and illustrations <[skylinecollege.edu/case](http://skylinecollege.edu/case)>

<sup>3</sup> Campbell, N. and J. Reece. *Biology*, 8<sup>th</sup> ed San Francisco: Benjamin/Cummings.