

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.

Academic honesty. Plagiarized lab reports and papers will receive a score of zero. Refer to the Student Handbook.

The Grade of W

You may wish to withdraw from this class. If you withdraw prior to 2-16-10 nothing will appear on your record. If you withdraw between 2-16-10 and 4-29-10, a *W* will appear on your transcript. You will receive a *W* for exceeding six absences prior to 4-29-10.

Anyone exceeding six absences after 4-29-10 will get a final grade of F.

Textbooks

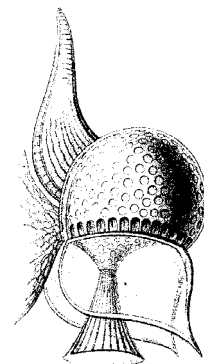
Campbell, N. and J. Reece. *Biology* 8th ed. San Francisco: Benjamin/Cummings.
Case, C. L. *Laboratory Experiments in Cell Biology*. Skyline College, 2009.

Study Aids. Study questions and vocabulary words can be found at the BIOL 230 web site <skylinecollege.edu/case>. 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



LECTURE SCHEDULE

Skim the assigned pages before lecture and then study them for comprehension after lecture. Look for the class handouts* online.

Lecture #	Topic	Reading: Campbell, N. and J. Reece. <i>Biology</i> , 8 th 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
	TEST	
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
	TEST	
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
	TEST	
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
May 24	FINAL	11:10 AM-1:40 PM

DATES TO REMEMBER

Assignment	Date due
Biosurfing*	2-5-10
Select a project*	2-12-10
Lab notebook* due with draft protocol.....	2-26-10
Journal article* related to your project	3-5-10
Lab notebook due with revised protocol + Include Supply Request* page	3-19-10
Lab notebook due (midterm reporting).....	4-2-10
All project-related lab work done	5-7-10
Project Lab notebook due	5-19-10
Report due (Late papers will not be accepted.).....	5-19-10

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 three separate pages. a. Each figure must be numbered and have a legend. b. Refer to each figure in the body of the text. c. Figures should be graphs of your data, photographs/diagrams of your work; relevant chemical formulas.
1	3. Content: each of the following must be limited to one page.
4	
3	
10	
10	
10	
12	
5	
15	4. Lab notebook: See the guidelines on the BIOL 230 web site.
20	a. General format
	b. Regular lab entries over weeks
100	Total points

¹Procedures

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

²General format

Followed all directions explicitly with no exceptions.

Presentation is neat and orderly throughout.

Spelling and grammar were flawless.

- See BIOL 230 at <skylinecollege.edu/case> for instructions and further information.

Research Project

Background*

Your project will be associated with one of the topics listed as “companies” on the BIOL 230 website. These are current areas of research in cell biology.

Purpose

Working in groups of two students, you will

1. Answer the following questions in the background:
 - What will you be looking for?
 - Why is this important?
2. What will you look for with your experiments?
 - What is your control?
 - How many trials will you do?
3. Discuss the significance of your results
4. Write your report in the proper format.*

Hypothesis*

Materials*

You must turn in the Supply Request form before you begin working

Procedures

- Design experiments
- Plan your work so that you do lab work through the semester, do *not* leave lab work until the last week.
- Implement five different experiments.

Results*

- Displaying data

Discussion & Conclusions

Literature Cited

You are encouraged to read all the available information on the topic for your paper. To select appropriate references, you must evaluate your sources of information. Print and electronic encyclopedias are often good to get familiar with a topic; however, these are not appropriate references for a research paper. The most reliable information is that published in **peer-reviewed journals**. Peer-reviewed means that the author’s work has been read and accepted by colleagues in his/her discipline.

Start your literature search with Highwire, PubMed, or another science database and search on your topic. Read the abstracts and keep a list of interesting articles. Note, you must read and cite the articles. Highwire, PubMed, and other databases are **not** citations; these are indexes to articles. Read more*

*Read more at <http://skylinecollege.edu/case>

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 2-16-10 nothing will appear on your record. If you withdraw between 2-16-10 and 4-29-10, a *W* will appear on your transcript. You will receive a *W* for exceeding four lab absences prior to 4-29-10.

Anyone exceeding four lab absences after 4-29-10 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 × 10 points each = 220 points

Required Materials

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

SHARPIE pen to label your Petri plates and test tubes

Open Lab

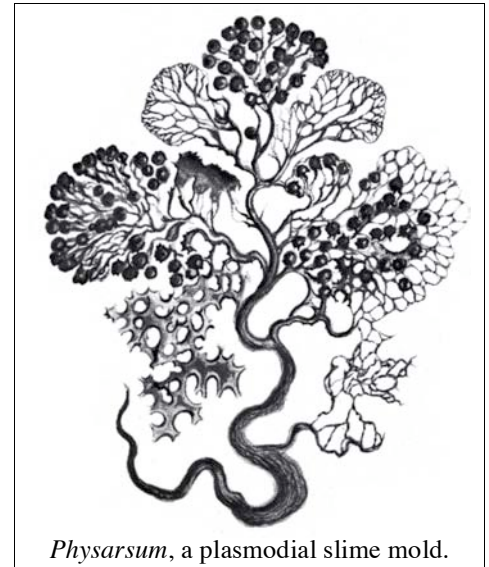
The lab is available for use whenever there are no classes scheduled. The hours are posted by the door. Use this time to record results of experiments in progress, complete unfinished work, and work on independent projects.

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 possible points each late day.

Tues	Thur	Experiment Title ^{1,2}	Reading ³
1-19	1-21	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
1-26	1-28	Cell Structure and Microscopy <i>How are your ferns doing?</i>	Ch. 6
2-9	2-11	Tissue Printing Muscle Cells	pp. 746-750 pp. 1066-1072
2-16	2-18	Biologically Important Organic Molecules Gel Filtration	Ch. 5 Fig. 5.8
2-23	2-25	Diffusion and Osmosis <i>How are your ferns doing?</i>	pp. 132-135
3-2	3-4	<i>Read about Aseptic Techniques on the BIOL 230 web site.</i> Genetic Engineering of Plants	pp. 412-415, 421, 814-815
3-16	3-18	Membrane Receptors <i>Fern Development due</i> <i>You should be starting your research.</i>	p. 130
3-23	3-25	Lactate Dehydrogenase Isoenzymes Cellular Metabolism	Fig. 9.18b Ch. 9
3-30	4-1	Enzyme Kinetics	Ch. 8
4-13	4-15	Photosynthesis	Ch. 10
4-20	4-22	Mitochondria Bioremediation	pp. 170-172 p. 420, 572, 1260-1261
4-27	4-29	Industrial Fermentation <i>Transfer clones</i>	Fig. 53.11, 53.13
5-4	5-6	Isolation of DNA DNA fingerprinting <i>Bioremediation due</i>	Fig. 16.21 pp. 416-417, 405
5-11	5-13	Transformation <i>Genetic Engineering of Plants due</i>	pp. 396-399
5-18	5-20	Polymerase Chain Reaction. Lab check-out	pp. 403-404

¹ Case, C. L. *Laboratory Experiments in Cell Biology*. Skyline College, 2009.

² See the **BIOL 230 web site for helpful hints and illustrations** <skylinecollege.edu/case>

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