

## WELCOME TO BIOLOGY 230!

**Course Number.** BIOL 230 (CRN 30152, 34782, & 47027)

**Course Title.** Introduction to Cell Biology: Core II  
Science, Technology, Engineering, Math Division  
5 units

Room: 8302

MWF, 12:10-1:00 + 5.5 lab hours per week +.

**Course Prerequisites:** Completion of CHEM 210; and BIOL 215 (Skyline College), or 210 or 220 (College of San Mateo), or 225 (Cañada College).

**Course Classification:** Transfer credit: UC; CSU (B2, B3).

**Course Description.** As part of a two-course core program, Biology 230 is an introduction to life functions as seen at the cellular level; cellular structure, macromolecular architecture and function, cellular energetics, chemical regulation, photochemical activities, molecular genetics, and genetic engineering.

**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 80 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.

**Instructor.** Dr. Christine Case

Please contact the instructor at any time with questions concerning the course, an assignment, an upcoming quiz, etc. My office hours are posted at [skylinecollege.edu/case](http://skylinecollege.edu/case)

Office: 7214

Phone: 650.738.4376

email: [case@smccd.edu](mailto:case@smccd.edu)

**Student Learning Outcomes.** After completing this course, you will be able to:

1. Understand 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.

The instructor's presentation and class discussion will provide current information, highlight major concepts, and help you develop critical thinking and problem-solving skills. Unannounced quick quizzes will be given.

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

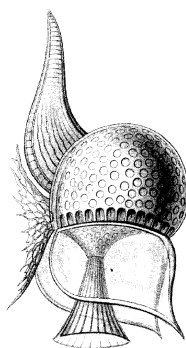
**The Grade of W.** Dates to know: If you withdraw prior to 2-6-22 nothing will appear on your record.

If you withdraw between 2-6-22 and 4-28-22, a *W* will appear on your transcript. You will receive a *W* for exceeding six absences or two lab absences *prior* to 4-28-22. Anyone exceeding six absences or two lab absences *after* 4-28-22 will get a *final grade of F*.

**Requirements.** All homework, all exams, one research project, 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.

*Required student preparation:* Lectures, lab activities, and term project constitute the main activities of the class.

*All assignments, two midterms, and one final examination must be taken for a passing*



A dinoflagellate

grade. All Lab Reports and lab post tests must be completed to earn a passing grade.

Lecture: 60%. Includes 40 points for HBA work.-Log into SARS when doing your HBA hours. Laboratory 40%.

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

Class participation will be taken into consideration during grading.

*Class conduct policy:* You are also responsible for adhering to the Code of Student Conduct outlined in the College Catalog. Cell phones *must be turned off* during class. No extraneous conversation during class.

*Academic honesty.* Plagiarized lab reports and papers will receive a score of zero. The work you submit must be your own. The Skyline College Catalog has a complete statement defining cheating and plagiarism.

*Skyline College* is committed to maintaining a safe and caring college environment. A District website has also been developed which provides you with important information about sexual misconduct and sexual assault. <[smccd.edu/titleix/](http://smccd.edu/titleix/)>

The Educational Access Center provides accommodations, counseling, and support services to students with documented disabilities. For assistance, please contact the EAC in room 5132 or call 650-738-4280.

#### Textbooks

Urry, L. *et al.* (2021). *Campbell Biology*, 12th ed. San Francisco: Pearson.

Case, C. L. (2022). *Laboratory Experiments in Cell Biology*. Skyline College.

**Study Aids.** Study questions, class handouts, 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.

## Research Project.

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

During the semester you will do a **laboratory** research project. Your research project will be done in pairs and each member will get the same score.

### Background\*

Your project will be associated with one of the current areas of research in cell biology listed on the BIOL 230 website. Start your literature search with PubMed, Google scholar, 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 appropriate articles.

### 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 at least one week 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 in tables and graphs.

### 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. Encyclopedias and wikis 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.

Research Paper	
Points	Format
4	1. General Form <sup>1</sup> : 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. 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 <b>one</b> page.
4	a. Title page
3	b. Abstract. Include purpose and brief summary of <i>your work</i> .
10	c. Hypothesis
10	d. Background. A review of current literature on this topic.
10	e. Procedures <sup>2</sup> . A description or flow chart of <i>your procedure</i> .
10	f. Results. Tables and graphs presenting <i>your experimental results</i> .
12	g. Discussion. A discussion of the intent of your procedures and what you found.
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.
11	4. <b>Lab notebook:</b> See the guidelines on the BIOL 230 web site.
24	a. General format
100	b. Regular lab entries over weeks (-4 for every late check-in)
	<b>Total points</b>

<sup>1</sup>General format

Followed all directions explicitly with no exceptions.

Presentation is neat and orderly throughout.

Spelling and grammar were faultless.

<sup>2</sup>Procedures: The activities implemented involved five different experiments.

## Dates To Remember

Assignment	Date due
Biosurfing* .....	2-4-22
Select a project* .....	2-16-22
Journal article* related to your project.....	3-11-22
It is your responsibility to meet with the instructor to go over your <i>Lab notebook</i> to show the following. You will lose 4 points if you are late or if I have to track you down:	
draft protocol .....	by 3-11-22
revised protocol .....	by 3-18-22
include Supply Request* page .....	by 3-21-22
Lab notebook due (midterm reporting) .....	by 4-15-22
All project-related lab work done .....	5-6-22
Project Lab notebook due .....	5-13-22
Report due (Late papers will not be accepted.) .....	5-13-22

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



## LECTURE SCHEDULE

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

Lecture #	Topic	Reading: <i>Campbell Biology</i> , 12 <sup>th</sup> ed.
1	Introduction	
2	Cell theory	Ch. 1
3	Cell evolution	§25.3, §27.3
4	Tree of Life	Ch. 26
5	Microscopy	Appendix D
6	Cell structure	Ch. 6, §27.1
7-9	Membranes	§7.1
10	Transport across membranes	§7.2-§7.5
	<b>TEST</b>	
12-13	Organic molecules	Ch. 5
14	Energy	§8.1-§8.3, §9.1
15-16	Enzymes	§8.4, §9.1
17	Catabolism	Ch. 9
18	Electron transport chains	§9.4
19-21	Photosynthesis	Ch. 10
22	Anabolism	§9.6
	<b>TEST</b>	
24-25	DNA synthesis	Ch. 16
26-27	Protein synthesis	Ch. 17
28	Control of gene expression	Ch. 18
29	Mutation & natural selection, & disease	§17.5
30	Evolution of genomes	Ch. 21
31	Recombination	§27.2
32-33	Viruses	Ch. 19
34	Biotechnology	Ch. 20. §38.3
	<b>TEST</b>	
36-37	Ecology	§27.3, §37.3, §55.4, §55.5
38-39	Growth	§12.3
40	Cell communication	Ch. 11, 48
41	Cancer	§18.5
42	Immunity	Ch. 43
<b>May 25</b>	<b>FINAL</b>	<b>11:10 AM-1:40 PM</b>

## WELCOME TO THE BIOLOGY 230 LABORATORY!

**Course Number:** BIOL 230 (CRN 30152, 34782, & 47027)

**Course Title:** Introduction to Cell Biology: Core II  
Science, Math, Technology Division

5 units

Room: 7241

T or Th, 1:10-6:15 +

**Hours by Arrangement:** In addition to regular class hours you must complete 16 lab hours by arrangement (HBA). That is, 1 hr/wk following up on an assigned experiment or working on your project. Log into SARS when doing your HBA hours.

**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:** Dates to know: If you withdraw prior to 2-6-22 nothing will appear on your record. If you withdraw between 2-6-22 and 4-28-22, a *W* will appear on your transcript. You will receive a *W* for exceeding six absences or two lab absences *prior* to 4-28-22. Anyone exceeding six absences or two lab absences *after* 4-28-22 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, 20 × 10 points each = 200 points

### Required Materials

Case, C. L. (2022). *Laboratory Experiments in Cell Biology*. Skyline College.

**SHARPIE** pen to label your plates and 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 your independent project.

**Instructor:** Dr. Christine Case

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

**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.

**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.



*Physarum*, a plasmodial slime mold.

## 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.

Tu	Th	Experiment Title <sup>1,2</sup>	<i>Campbell Biology</i> , 12 <sup>th</sup> Reading <sup>3</sup>	Score
1-18	1-20	Cell Behavior and Slime Molds Fern Development Lab Safety, pp. v-vi . Lab check-in	pp. 612-613 Fig. 29.12	
1-25	1-27	Cell Structure and Microscopy Muscle Cells <i>How are your ferns doing?</i>	Fig. 6.8 §50.5 (pp.1125-1132)	
2-1	2-3	Tissue Printing	§35.3 (p. 768-771)	
2-8	2-10	Biologically Important Organic Molecules Gel Filtration	§5.1-§5.4 Fig. 5.7	
2-15	2-17	Diffusion and Osmosis <i>Post your fern results on Canvas</i>	§7.3 (pp. 132-135)	
2-22	2-24	Take the cloning pre-test <sup>4</sup> <i>before</i> Lab. Genetic Engineering of Plants	§20.3, §38.2	
3-1	3-3	Membrane Receptors <i>Fern Development due</i>	§7.1 (pp. 126-131)	
3-8	3-10	Lactate Dehydrogenase Isoenzymes Bioremediation	Fig. 9.17 §55.5 (pp. 1253-1255)	
3-15	3-17	Cellular Metabolism (see modification on Canvas)	Ch. 9	
3-22	3-24	Enzyme Kinetics <i>Bioremediation due</i>	Ch. 8	
4-5	4-7	Photosynthesis	Ch. 10	
4-12	4-14	<i>Transfer clones</i> Project research		
Week of 4/19		Insect collection (Canvas)		
4-26	4-28	Mitochondria <i>Genetic Engineering of Plants due</i>	§9.3, §9.4 (pp. 171-178)	
5-3	5-5	Industrial Fermentation	§53.2 & §53.3 (pp. 1196-1200)	
5-10	5-12	Complete the prelab <i>before</i> Lab. (Canvas) Polymerase Chain Reaction (Canvas)	Fig. 20.7	
5-17	5-19	<i>Industrial fermentation due</i> <i>PCR due</i> Lab check-out		

1 Case, C. L.(2022) Laboratory Experiments in Cell Biology. Skyline College.

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

3 Urry, L. et al. (2021). Campbell Biology, 12th ed. San Francisco: Pearson.

4 Read about Aseptic Techniques on the BIOL 230 web site and take the online cloning pretest before lab.