

## Syllabus LIFE 212 Intro. Cell Biology Lab

This course represents combined sections 6-10.

**Instructor: Dr. Corey Rosenberg;** Email: [corey.campbell@colostate.edu](mailto:corey.campbell@colostate.edu). All emails will be answered within 36 hours. Office A/Z E206F (Go to the east end of the 1st floor of the Anatomy/Zoology building and find the open staircase near the CVMBS computer lab. Come up the open staircase and turn left. Rm E206 is on the right. My office is inside.)

**Weekly study session in A/Z E206F:** Mon 2:30 - 3:30pm & Wed 1-2pm; also available on MS Teams (please email to arrange a meetup).

GTA	HOURS	VENUE
Alex	Wed 12-1pm; Thurs 5-6pm	MS Teams; Yates 310
Leah		MS Teams; Yates 310
Logan	Tues 10-12pm	MS Teams; Yates 310
Sarah		MS Teams; Yates 310
Sasha		MS Teams; Yates 310

## **Weekly Recitation Yates 104, Mondays 4-4:50pm, mandatory.**

Prerequisites- CHEM 112 and LIFE 210, both may be taken concurrently.

### **LAB sections**

**Section L06, Thurs 9:00 - 11:50AM, Yates 309**

**Section L07, Thurs 9:00 - 11:50AM, Yates 311**

**Section L08, Thurs 9:00 - 11:50AM, Yates 316**

**Section L09, Thurs 2:00 - 4:50PM, Yates 309**

**Section L10, Thurs 2:00 - 4:50PM, Yates 311**

## **Course Description**

LIFE 212, Introductory Cell Biology Lab, offers an overview of techniques employed by cell biologists and biochemists in research labs. Students learn basic scientific skills of data collection, interpretation, critical thinking and lab notebook entry skills, all while learning the experimental methods and instrumentation that are commonly used in cell and molecular biology research labs. Techniques such as lab math calculations, immunoassays for the detection of antigens, UV/visible spectrophotometry, enzyme purification and kinetics, protein gel electrophoresis and analysis of proteins are covered. Students also gain experience in basic principles of light microscopy and fluorescence cell structure visualization. Additionally, respiration and photosynthesis are covered.

Each week, the recitation will cover important background material that sets the context for a given experiment or lab exercise. After watching the recitation lecture, and before attending lab, you will complete an online quiz to assess how well you've prepared for lab day. During the lab period, you will execute each experiment and submit a lab report.

## **Course Objectives**

By the end of this course, you will be able to:

1. Demonstrate basic lab math skills through mastery of basic computational chemistry and units of measurements.
2. Apply critical thinking principles to scientific data.
3. Practice predicting results for experiments similar to those done in class, eg., protein quantitation, separation and spectrophotometer use in the study of enzyme assays.
4. Acquire hands-on skills for use of fundamental scientific instruments, eg., microscopes, spectrophotometers, fluorescence microscopes.
5. Acquire working knowledge of how scale and imaging methods relate to the limits of resolution in subcellular imaging.
6. Obtain practical knowledge of the important features of immunoassays.
7. Describe the metabolic pathways of respiration and photosynthesis.
8. Practice reading scientific papers and learning scientific terminology and its importance to science communication.
9. Practice technical writing through lab reports and a science journal format term paper.

## **REQUIRED MATERIALS**

**Lab Manual-** Exercise instructions, background information, and weekly lab report forms are in an online lab manual. Purchasing is available to you through CSU bookstore or Kendall Hunt Publishing CO. ISBN: 9798765708057. Safadi-Chamberlain, Farida. “Cell Biology Laboratory Manual” (Fifth Edition). Kendal Hunt Publishing Company. Dubuque, IA.

The lab manual can be purchased directly from the CSU bookstore or Kendall Hunt at <https://he.kendallhunt.com/product/cell-biology-laboratory-manual-2>

For troubleshooting ordering/purchasing, you can email [orders@kendallhunt.com](mailto:orders@kendallhunt.com) or call 800-228-0810.

If you have trouble with your access code you can email [websupport@greatriverlearning.com](mailto:websupport@greatriverlearning.com)

or fill out the [Kendall-Hunt online help form](#). Additional exercises and supporting materials will be posted on Canvas and should be downloaded prior to each lab period. Each recitation will be devoted to 1) weekly updates, announcements and important background information for the week’s experiment. Recorded versions of older recitations are available as videos under the Lectures tab.

Closed toed shoes, shirt sleeves and leg coverings to the knee are required for entry into the lab.

**MS Word.** This course will require online report, lab notebook and quiz submissions. Lab reports and the electronic lab notebook have been provided as MS Word fillable documents.

**CANVAS online.** Exercises, instructions and supporting material will be posted online at <http://info.canvas.colostate.edu/login.aspx>. This will be the online educational platform that LIFE 212 instructor and TAs will use to communicate with students.

**MS Teams** will be used as an optional platform to connect with GTAs and for study sessions with the Learning Assistant.

**Lab Teams pledge.** All students are required to agree to the Teams Honor Pledge (under the quiz tab) by the deadline in order to participate in this course.

## **COVID guidelines**

**You must also meet university vaccine or exemption requirements. All students are expected and required to report to the [COVID Reporter](#) when:**

- You suspect you have symptoms of COVID, regardless of whether or not you are vaccinated and even if your symptoms are mild
- You have tested positive for COVID through a non-CSU testing site, such as home test or test at a pharmacy
- You believe you may have been exposed to COVID go to the COVID Reporter and follow the guidance under “I believe I have been in close contact with someone who has COVID-19.” This guidance will depend upon your individual circumstances

You will not be penalized in any way for reporting symptoms or concerns.

**It is your responsibility to report through the COVID Reporter promptly. You may freely volunteer to send me information from a public health official if you have been asked to isolate or quarantine.** When you complete the COVID Reporter, the CSU Public Health office is notified. Once notified, that office will contact you and, depending upon each situation, will conduct contact tracing, initiate any necessary public health requirements and notify you if you need to take any steps. If you do not have internet access to fill out the online COVID-19 Reporter, please call (970) 491-4600.

For the latest information about the University's COVID resources and information, including FAQs about the spring semester, please visit the **CSU COVID-19 site** <https://covid.colostate.edu/>.

## WEEKLY ASSIGNMENTS

**Weekly recitation** will provide important principles in advance of the week's experiments, as well as changes to the protocol, and emphasize key points covered on weekly quizzes.

**Pre-lab writeup (lab notebook)** emulates the researcher's lab notebook.

**Quizzes (20 points each)** - The weekly open notebook quiz will cover the current week's lab (pre-lab write-up and background principles) and more comprehensive material from the previous week's lab. Students who read background material and lecture slides prior to the Monday lecture and are conscientious in their observations and data evaluation/processing should do well on quizzes and laboratory reports. Study sources include lecture slides and covered material and lab manual background information.

**Execution of Experiments:** Instrumentation and equipment will be used that is found in a typical cell biology research laboratory. Experiments will be done individually, and lab reports will be submitted individually through Canvas. Ultimately, it is up to you, as an individual student, to ensure that all data is collected during the lab session and all assignments are submitted on time.

**Lab Reports (50 to 100 points each)** will be a mix of data reporting and critical thinking responses. If an experiment produces atypical or unusual results, be sure to provide a short explanation as to the possible reason for any anomalies. **Laboratory reports will be due the following week on Thursday.** Late laboratory reports will incur 10 points deduction. All assignments will be submitted in the Canvas portal.

**Lab Performance grade** All students are required to clean their work stations, glassware and reagent tubes when finished and properly dispose of experimental waste, dump ice and put away all assigned equipment. Important- record your experimental conclusion in your lab notebook. Finally, check out with an Instructor before you leave.

## Keys to success:

A. Each week, plan to 1) Look over the lecture slides and course manual for important background material before the weekly lecture. 2) Attend the recitation lecture and take notes.

At the weekly lecture, tips for success, important reminders, added details pertinent to the week will be explained. 3) Take the weekly quiz on Monday. 4) Complete the pre-lab writeup BEFORE your lab period.

B. Your active engagement with Instructors and TAs is important. We look forward to answering your questions each week in lab. Because TAs are teachers in training, so they might not know all the answers. If you are not satisfied with a TA's response, feel free to ask the Instructor. If you have any concerns about your TA, please let Dr Rosenberg know.

C. In problem-solving, show all your work and calculations. Your math should be easy to follow. If a problem asks for repetitive calculations, provide one example calculation and write a statement to that effect in the answer. Always include units (note: some values are unitless), including graphs.

D. Lab reports or any other assignment turned in late will be subject to 10 pts deduction per assignment.

E. If your experimental data do not come out as expected, be sure to write a **detailed explanation** for what went wrong in the same location as the erroneous data in the lab report. Data collection is a prelude to data analysis, so if you don't have data to analyze, and subsequently cannot fill out other questions on the lab report, points will be lost for uncompleted portions of the report. **Please bring data collection problems to the Instructor's attention immediately.**

**Procedure for assignment re-grading.** If you feel that a mistake has been in grading your assignment, follow these steps. Submit the packet described below to Dr Rosenberg; at that time, she will discuss the question with you and come to a decision about whether points will be awarded. **Compile a packet containing-**

1. **The question/answer with the mistake should be circled and highlighted.**
2. **If the answer is based on lecture material, print out a copy of the lecture material showing the information that is pertinent to the question.**
3. **Provide a written explanation of the reason you should receive point(s) back.**

**Laboratory performance/participation grade** (5 points per week; up to 65 points per semester) is a measure of students' weekly participation and cooperative attitude in the lab notebook pre-lab write-up and data recording, execution of the experiment,

recitation attendance, thoroughness in following the protocols and safety requirements, lab courtesy, as well as tidiness and the conscientious use of lab supplies and equipment. You are expected to complete each experiment and work on the report during the lab period. You are also required to clean up your lab bench and get instructor approval of that cleanup prior to leaving. Relying on your lab partner to do the experiment is not acceptable. Scientific research and experimentation require special qualities of patience, organization, and accuracy. Some experiments require that you come at a later time of the day or the next day to finish up. Neglect of any of these items can result in the loss of lab performance points.

Group discussions with your peers and the TAs regarding questions in the report are highly encouraged.

**Missed laboratory sessions cannot be made up and may result in a Zero score on the Lab Report. If you cannot attend a lab, contact Dr Rosenberg (not the TA) in advance to arrange to attend another laboratory section.** If you cannot contact the instructor in advance, plan to submit a documented medical release form signed by your physician.

## **Academic Integrity**

**Cheating/Plagiarism** All written work in quizzes, reports and exams shall be the work of the individual student; using another student's work is considered cheating. Falsification of data from experiments is also considered cheating. Plagiarism is the use of information without appropriate citation of sources. Instructors allow quizzes to be taken with an open lab notebook. This is meant to encourage detailed note-taking. Plagiarism and cheating are academically dishonest and, as such will incur penalties in accordance with CSU policy. Appropriate use of Resources: If Internet or primary literature sources are used, they must be cited every time they are used in a written assignment. Penalties for cheating/plagiarism/data falsification: In accordance with CSU Academic Integrity Policies, cheating/plagiarism may result in a reduced grade for a given assignment, a failing grade for the course or the removal of the repeat/delete option for the course.

- Cheating; includes using unauthorized sources of information and providing or receiving unauthorized assistance on any form of academic work or engaging in any behavior specifically prohibited by the faculty member.
- Plagiarism; includes the copying of language, structure, ideas, or thoughts of another, and representing them as one's own without proper acknowledgment.
- Unauthorized Possession or Disposition of Academic Materials; includes the unauthorized selling or purchasing of examinations or other academic work; stealing another student's work; unauthorized entry to or use of material in a computer file; and using information from or possessing exams that an instructor did not authorize for release to students.
- Falsification; any untruth, either verbal or written, in one's academic work.
- Facilitation; knowingly assisting another to commit an act of academic misconduct.

**Exams (100 points each)** There will be a midterm and a cumulative final exams. The final exam is cumulative. Practice exams are available under the 'Quiz' tab in Canvas.

## GRADING POLICY

The following grading standards will be used in this class:

Grade	Range
A	100 % to 90.0%
B	< 90.0 % to 80.0%
C	<80.0% to 70%
D	< 70.0 % to 50.0%
F	< 50.0 % to 0.0%

## Course points allocation- 1268 pts possible

	<i>Points each</i>	<i>Semester totals</i>	<i>Semester Pts total</i>
Quizzes	20 pts	9	180
Lab reports	50-100	12	660
Lab notebook-weekly checks	10	10	100
Lab performance/safety			65
Exam	100	2	200
misc.	8		8
e-Poster & staged assign.	55		55

**Staged Scientific writing assignment (e-poster)** A LIFE 212 topic of your choice (subjects: Michaelis-Menten kinetics, protein electrophoresis, mitochondrial respiration, immunofluorescence), may be used as subject matter for a formal lab report, composed in the form of an e-poster. **You will report your own data from a LIFE 212**

experiment. You are encouraged to think creatively on how best to report that information in an engaging format for the reader. Detailed e-poster instructions will be available on Canvas under Canvas/ 2020FA-LIFE-212/ Modules/ eposter.

There are additional guidelines for literature searches available at our course [scientific paper help site](#), prepared especially for us. Feel free to contact the librarian on the website if you want additional pointers for finding quality peer-reviewed articles.

**Library & Research Help** The [CSU Libraries Help Desk](#) provides both research (Ph. 970-491-1841) and technical (Ph. 970-491-7276) support.

## Weekly Schedule

LAB WEEK	LECTURE TOPIC	LAB DAY
Aug 22-26	Recitation: Course overview; Lab Math	<b>Lab 1:</b> Lab Math Review
Aug 29- Sept 2	Recitation: Innate Imune Response /ELISA  <b>Quiz 1</b>	<b>Lab 2:</b> Mock HIV diagnostics
Sept 5-9	Monday- Labor Day holiday (Recitation cancelled)  Lab day lecture- Enzyme Linked Immunosorbent Assay	<b>Lab 3, ENZYMES I:</b> Characterization of Tyrosine Enzyme
Sept 12-16	Recitation: (4) Environmental effects on Enzyme Activity  and  (5) Parameters of Enzyme Kinetics  <b>Quiz 2</b>	<b>Lab 4, ENZYMES II:</b> Effects of Enzyme Concentration, pH and Temperature on Enzyme Activity  <b>Lab 5: ENZYMES III:</b> Kinetic analysis of the Tyrosinase Enzyme



<p>Sept 19-23</p>	<p>Recitation: Characterization of Proteins: Protein Gel Electrophoresis and Quantitation</p> <p>Quiz 3</p>	<p><b>Lab 6:</b> Protein gel Electrophoresis, Bradford Assays</p>
<p>Sept 26-30</p>	<p><b>Staged Writing Assignment #1 due Sept 26:</b> Lit review- Title, Author, Literature search, which contains at least three relevant primary research articles and Synopsis for each (20 pts)</p> <p>Quiz 4</p>	<p><b>Unit 1 review</b></p>
<p>Oct 3</p>	<p>Exam I covers Lab exercises 1-6</p> <p>Report 6 due</p>	<p>no experiment this week</p>
<p>Oct 10-14</p>	<p>Recitation: Introduction to Microscopy</p> <p><b>Staged Writing Assignment #2 due Oct 10th:</b> Introduction (15 pts)</p>	<p><b>Lab 7:</b> Brightfield Light Microscope use</p>
<p>Oct 17-21</p>	<p>Recitation: Light Microscopy continued</p>	<p><b>Lab 8:</b> Microscope Viewing of different cell types</p>

<p>Oct 24-28</p>	<p>Recitation: Cell fractionation, Mitochondria Isolation/Respiration</p> <p style="text-align: center;">Quiz 5</p>	<p><b>Lab 9:</b> Qualitative Assay of Mitochondrial Respiration</p>
<p>Nov 3</p> <p>RECITATION lecture cancelled</p> <p>Be sure to watch lecture video, so you are ready for the quiz and for our experiment this week.</p>	<p>Recitation: Introduction to Photosynthesis: Light/Hill Reactions</p> <p style="text-align: center;">Quiz 6</p>	<p><b>Lab 10:</b> Chloroplast Isolation / Quantitative Assay of Hill reaction</p>
<p>Nov 7-11</p>	<p>Recitation: Introduction to Fluorescence Microscope</p> <p style="text-align: center;">Quiz 7</p>	<p><b>Lab 11:</b> Immunostaining of Cells for Fluorescence Microscopy</p>
<p>Nov 14-18</p>	<p>Recitation: Fluorescence Microscopy continued- The Hemocytometer and Cell Viability Assay</p> <p><b>Staged Writing Assignment final version due November 14th</b></p> <p style="text-align: center;">Quiz 8</p>	<p>Fluorescence <b>Lab 11</b> cont'd;</p> <p><b>Lab 12:</b> Labeled Cell viewing, Cell Viability Assay</p>
<p>Nov 21-25</p>	<p style="text-align: center;">Fall Break</p>	<p>No labs</p>
<p>Nov 28-Dec 2</p>	<p>Elements of Experimental Design</p> <p style="text-align: center;">Quiz 9</p>	<p><b>Lab 13:</b> Experimental Design Workshop</p>

Dec 5	Recitation:  Review	Lab day: Checkout and evaluation  Practice exam
Dec 12th	Final exam	11:50-1:50pm

## CANVAS INFORMATION & TECHNICAL SUPPORT

Canvas is the where course content, grades, and communication will reside for this course.

- Login: [canvas.colostate.edu](https://canvas.colostate.edu)
- Support: [info.canvas.colostate.edu](https://info.canvas.colostate.edu)
- For passwords or any other computer-related technical support, contact the [Central IT Technical Support Help Desk](#).

o (970) 491-7276

o [help@colostate.edu](mailto:help@colostate.edu)

The [Technical Requirements](#) page identifies the browsers, operating systems, and plugins that work best with Canvas.

### ACADEMIC INTEGRITY & CSU HONOR PLEDGE

This course will adhere to the CSU [Academic Integrity/Misconduct policy](#) as found in the General Catalog and the Student Conduct Code.

Academic integrity lies at the core of our common goal: to create an intellectually honest and rigorous community. Because academic integrity, and the personal and social integrity of which academic integrity is an integral part, is so central to our mission as students, teachers, scholars, and citizens, I will ask that you affirm the CSU Honor Pledge as part of completing your work in this course.

### UNIVERSAL DESIGN FOR LEARNING/ACCOMMODATION OF NEEDS

I am committed to the principle of universal learning. This means that our classroom, our virtual spaces, our practices, and our interactions be as inclusive as possible. Mutual respect, civility, and the ability to listen and observe others carefully are crucial to universal learning.

If you are a student who will need accommodations in this class, please contact me to discuss your individual needs. Any accommodation must be discussed in a timely manner. A verifying memo from [The Student Disability Center](#) may be required before any accommodation is provided.

The Student Disability Center (SDC) has the authority to verify and confirm the eligibility of students with disabilities for the majority of accommodations. While some accommodations may be provided by other departments, a student is not automatically eligible for those accommodations unless their disability can be verified and the need for the accommodation confirmed, either through SDC or through acceptable means defined by the particular department. Faculty and staff may consult with the SDC staff whenever there is doubt as to the appropriateness of an accommodative request by a student with a disability.

The goal of SDC is to normalize disability as part of the culture of diversity at Colorado State

University. The characteristic of having a disability simply provides the basis of the support that is available to students. The goal is to ensure students with disabilities have the opportunity to be as successful as they have the capability to be.

Support and services are offered to student with functional limitations due to visual, hearing, learning, or mobility disabilities as well as to students who have specific physical or mental health conditions due to epilepsy, diabetes, asthma, AIDS, psychiatric diagnoses, etc. Students who are temporarily disabled are also eligible for support and assistance.

Any student who is enrolled at CSU, and who self-identifies with SDC as having a disability, is eligible for support from SDC. Specific accommodations are determined individually for each student and must be supported by appropriate documentation and/or evaluation of needs consistent with a particular type of disability. SDC reserves the right to ask for any appropriate documentation of disability in order to determine a student's eligibility for accommodations as well as in support for specific accommodative requests. The accommodative process begins once a student meets with an accommodations specialist in the SDC.

#### THIRD-PARTY TOOLS/PRIVACY

Please note that this course may require you to use third-party tools (tools outside of the Canvas learning management system), such as Skype and others. Some of these tools may collect and share information about their users. Because your privacy is important, you are encouraged to consult the privacy policies for any third-party tools in this course so that you are aware of how your personal information is collected, used and shared.

#### COPYRIGHTED COURSE MATERIALS

Please do not share material from this course in online, print, or other media. Course material is the property of the instructor who developed the course. Materials authored by third parties and used in the course are also subject to copyright protections. Posting course materials on external sites (commercial or not) violates both copyright law and the CSU Student Conduct Code. Students who share course content without the instructor's express permission, including with online sites that post materials to sell to other students, could face appropriate disciplinary or legal action.

#### UNDOCUMENTED STUDENT SUPPORT

Any CSU student who faces challenges or hardships due to their legal status in the United States and believes that it may impact their academic performance in this course is encouraged to visit Student [Support Services for Undocumented, DACA & ASSET](#) for resources and support. Additionally, only if you feel comfortable, please notify your professor so they may pass along any additional resources they may possess.

#### TITLE IX/INTERPERSONAL VIOLENCE

For the full statement regarding role and responsibilities about reporting harassment, sexual harassment, sexual misconduct, domestic violence, dating violence, stalking, and the retaliation policy please go to: [Title IX – Sexual Assault, Sexual Violence, Sexual Harassment](#).

If you feel that your rights have been compromised at CSU, several resources are available to assist:

- Student Resolution Center, 200 Lory Student Center, 491-7165
- Office of Equal Opportunity, 101 Student Services, 491-5836

A note about interpersonal violence: If you or someone you know has experienced sexual assault, relationship violence and/or stalking, know that you are not alone. As instructors, we are required by law to notify university officials about disclosures related to interpersonal violence. Confidential victim advocates are available 24 hours a day, 365 days a year to provide support

related to the emotional, physical, physiological and legal aftermath of interpersonal violence. Contact the Victim Assistance Team at: 970-492-4242.

#### RELIGIOUS OBSERVANCES

CSU does not discriminate on the basis of religion. Reasonable accommodation should be made to allow individuals to observe their established religious holidays. Students seeking an exemption from attending class or completing assigned course work for a religious holiday will need to fill out the Religious Accommodation Request Form and turn it in to the Division of Student Affairs, located on the second level of the Administration building.

Once turned in, the Division of Student Affairs will review the request and contact the student accordingly. If approved, the student will receive a memo from the Dean of Students to give to their professor or course instructor.

Students are asked to turn in the request forms as soon as the conflict is noticed. Similarly, unanticipated conflicts requiring a religious observance, such as a death in the family, can also be reviewed.

#### CSU PRINCIPLES OF COMMUNITY

**Inclusion:** We create and nurture inclusive environments and welcome, value and affirm all members of our community, including their various identities, skills, ideas, talents and contributions.

**Integrity:** We are accountable for our actions and will act ethically and honestly in all our interactions.

**Respect:** We honor the inherent dignity of all people within an environment where we are committed to freedom of expression, critical discourse, and the advancement of knowledge.

**Service:** We are responsible, individually and collectively, to give of our time, talents, and resources to promote the well-being of each other and the development of our local, regional, and global communities.

**Social Justice:** We have the right to be treated and the responsibility to treat others with fairness and equity, the duty to challenge prejudice, and to uphold the laws, policies and procedures that promote justice in all respects.

#### DIVERSITY AND INCLUSION

[CSU's Mission and Vision are here.](#)