



The mission of Concord University is to provide quality, liberal arts based education, to foster scholarly and creative activities and to serve the regional community

(<http://www.concord.edu/academics/>).

Course Prefix, Number and Title: CHEM 347 Biochemistry Laboratory
Course CRN # and Section: 20247 01
Semester Taught: Spring 2019
Credit Hours: 1
Co-requisite: CHEM 341
Course Time: Thursdays 9:30 AM - 12:20 PM
Inclement Weather Time: 11:05 AM – 1:10 PM
Building and Room Number: Science 404

Professor: Dr. Kimberly Chambers, Assistant Professor of Chemistry & Biochemistry
Office Location: Science Hall Rm. 401D
Office Hours: M 12-1; W 9:30-10:30; R 1-2; F 9:30-10:30 & 12-1 Also by appointment
Email: kchambers@concord.edu
Phone: 304-384-6281 or x6281 (on campus)
Office Fax: 304-384-6225
College/Department Website: <http://www.concord.edu/physci/node/2>

Course Description/Rationale:

A laboratory course designed to accompany the concepts presented in CHEM 341. Students will conduct a project-based lab designed to give them a feel for research in a biochemistry laboratory. The course will introduce basic biochemistry techniques and provide an application for what is learned in lecture (CHEM 341). Students will be involved in weekly recitation and small-group discussion on experimental design and data analysis. A wide variety of experiments involving study of a protein will be performed. The laboratory skills learned in CHEM 347 will demonstrate several of the topics discussed in CHEM 341 as well as be applicable for those that pursue a research career in the fields of biochemistry, cell and/or molecular biology.

Course Management System: Moodle <https://moodle.concord.edu/login/index.php>
Course info: Chemistry 347 – Biochemistry Lab
Moodle Privacy Policy: <https://moodle.org/admin/tool/policy/view.php?policyid=1>
Moodle Accessibility Statement: <https://docs.moodle.org/34/en/Accessibility>
Hardware/Software Needed: Microsoft Word, Excel & PowerPoint

Text requirements:

CHEM 347: Biochemistry Laboratory Manual

Other required materials:

Safety goggles

Permanently-bound composition book for use as laboratory notebook

Sharpie permanent marker

Calculator

Concord University Educational Goals:

The mission, educational goals, and objectives of the chemistry program are aligned with the Concord University Mission and Educational Goals. This course addresses components of CU Educational Goals (<http://catalog.concord.edu/index.php>) pertinent to Skills #1, 2, 4 & 5 and components of the Chemistry Program Goals (<https://www.concord.edu/phyci/node/11>) #1.1, 2.1 & 3.2.

National Standards: Not applicable

Specific Learning Outcomes:

As a result of taking the course, the student should be able to:

- employ several biochemistry techniques to isolate and study a protein
- apply knowledge of biochemical concepts to understand process of protein purification and characterization
- develop critical thinking skills in analyzing experimental data and drawing reasonable conclusions
- assess the reliability of results and recognize sources of error
- summarize experimental results via written and oral communication in a clear, concise manner

Course Requirements:

The following assignments will be used to determine the student's grade in the class.

- **Pre-laboratory Exercises:** Pre-lab exercises are designed to familiarize the student with the lab exercise and stimulate thinking about how the experiment will be designed and executed. These assignments will be posted on Moodle and must be completed at least 30 minutes prior to the beginning of YOUR lab session each week. These pre-lab assignments will be graded. Two attempts are allowed for each pre-lab and the highest score will be used. A student will not be allowed to enter the laboratory without completing the pre-lab assignment.
- **Lab Notebook:** Each student will keep a laboratory notebook, which should be a primary record of your experimental procedures, results, data analysis and discussions. A detailed description of how to keep a laboratory notebook is provided in your laboratory manual. Several times throughout the semester, notebooks will be collected and graded.

- **Writing Assignments:** Throughout the semester, each group will write four sections of a laboratory report for various laboratory exercises as instructed by the professor. These will be first drafts for sections of your final paper; however, these drafts will be graded. Through these assignments, you will learn how to effectively write a scientific paper. A detailed description of how to write a laboratory report is provided in your laboratory manual. Each member of the group is expected to contribute to these assignments. Upon submitting each assignment, each member of the group will sign a statement that all members contributed equally to the assignment and that all members approve the submitted assignment.
- **Poster:** At the end of the semester, each group will prepare and present a poster summarizing their semester's work. A detailed description of how to prepare a poster is provided in your laboratory manual. A PowerPoint template will be provided. Once again, each member of the group is expected to contribute to this presentation. Upon submitting this assignment, each member of the group will sign a statement that all members contributed equally to the assignment and that all members approve the submitted assignment.
- **Laboratory Report:** At the end of the semester, each group will assemble the previously prepared sections of their report (see writing assignments) and add any additional information to compile a complete laboratory report summarizing the entire semester's work. A detailed description of how to write a laboratory report is provided in your laboratory manual. Each member of the group is expected to contribute to this assignment. Upon submitting the assignment, each member of the group will sign a statement that all members contributed equally to the assignment and that all members approve the submitted assignment.

Grading:

Pre-lab Exercises	20%
Lab Notebook	20%
Writing Assignments	20%
Poster	20%
<u>Laboratory Report</u>	<u>20%</u>
Total of	100%

Scale A: 90-100% B: 80-89% C: 70-79% D: 60-69% F: < 60%

Course Policies:

- **Attendance & Make-Up:**
Regular attendance is essential for adequate performance and is required. Although the instructor reserves the right to drop non-attending students, it is the student's responsibility to withdraw if they have decided not to complete the course. Accommodations for documented university or medical excused absences will be made on a case-by-case basis. In situations where the student is aware of the absence in

advance (athletic events, field trips, etc.), arrangements for conducting the lab during another section that week **MUST** be made prior to the absence. If a student misses lab due to an unforeseen circumstance, they must contact the instructor (see, email or call) before the end of the missed class period to make arrangements if applicable. Individuals that wait to speak with the instructor at a later date will not be granted permission to make up the lab. Make-ups must be completed within one week of the originally scheduled date. Individuals that miss more than 2 labs will receive an F in the course.

- **Electronic Assignment Submission:**
Some assignments require on-line submission via Moodle. On-line assignments must be completed in a timely fashion. An excuse for "technological difficulties" (internet was down, etc.) is not acceptable.
- **Late Assignments:**
Assignments that are not submitted at the specified times will be considered late. There will be a 10% deduction for every day late.
- **Safety:**
All appropriate safety guidelines will be adhered to strictly. Safety goggles must be worn at all times in the laboratory. In addition, the student must dress appropriately. Shoes that entirely cover your feet and clothing that entirely covers your torso and legs must be worn. Shoes with high heels, shorts, dresses/skirts, and long, flowing clothing will not be permitted in the lab. No exceptions will be permitted. Consult with the instructor if you have any questions. Students who do not follow safety instructions may have points deducted, be asked to leave without the possibility of make-up, or be dropped from the course.
- **Electronic Device Policy:**
All cell phones must be turned off during pre-lab and lab. The instructor reserves the right to make point deductions from your grade for using a cell phone during class.

Course Timeline (Schedule of Assignments/Assessments/Presentations):

This is a tentative schedule. The instructor reserves the right to modify this schedule as needed.

Lab:	Date:	Topic:
1	1/17	Overview of Semester-Long Project, Buffer Preparation, Review of Concentration, and Important Tips For Working With Proteins Notebooks Due
2	1/24	Discuss Scientific Paper, Adjustable Micropipette Use and Antibiotic Agar Diffusion Assays
3	1/31	Protein Purification Introduction and Literature Cited Due
4	2/7	Monitoring Antibiotic Purification Via Turbidimetric Assay
5	2/14	Protein Purification – Column Chromatography Notebooks Due
6	2/21	Discuss Scientific Paper and Monitoring Antibiotic Purification Via Turbidimetric Assay – Chromatography Fractions
7	2/28	Monitoring Antibiotic Purification Via Turbidimetric Assay – Chromatography Fractions Procedure for Purification Due
8	3/7	Quantification Of Total Protein Using Bradford Protein Assay or Assessment of Protein Purity & Molecular Weight Using SDS-PAGE
	3/14	Spring Break – No Class
9	3/21	Assessment of Protein Purity & Molecular Weight Using SDS-PAGE or Quantification Of Total Protein Using Bradford Protein Assay
10	3/28	Discuss Scientific Paper and Identification Of Proteins Using Mass Spectrometry
11	*4/4	Western Blotting To Assess Protein Identification Results and Discussion for Purification, SDS-PAGE and MS Due
12	4/11	Poster Prep Abstract Due (also submit to McNair)
13	**4/18	Undergraduate Research Day Poster Session – Rescheduled Time 12:30-1:45 PM**
14	4/25	Determining Protein Structure and Swiss PDB Viewer/Deep View Tutorial Final Report Due
15	5/2	Determining Protein Structure Notebooks Due
*	4/5/19	<i>last day to drop w/ "W"</i>

Accessibility/Accommodations:

Concord University is committed to responding to the needs of students with disabilities as defined by the Americans with Disabilities Act. Please inform your instructor at the beginning of the class semester if you have a disability and are requesting accommodations. It is your responsibility to self-disclose that you are requesting accommodations. The University and instructor will provide you with a reasonable accommodation. You should register with CU's Disability Services Office, located in the Athens campus Jerry and Jean Beasley Student Center, bottom floor, across from the Campus Post Office. The Disability Services Office phone is 304-384-6086 or you can email the Director, Nancy Ellison, at nellison@concord.edu for assistance.

Academic Dishonesty:

Academic dishonesty is morally unacceptable as well as destructive to the learning and teaching atmosphere. Academic dishonesty includes the giving or receiving of improper help on examinations or assignments, falsifying documents, and plagiarism (the act of stealing and using, as one's own, the ideas or the expression of the ideas of another). Such dishonesty can lead to a variety of penalties — including but not limited to failure of assignment, failure of course, loss of institutional privileges, or dismissal from the University. (See University Catalog Academic Policies and Procedures.)

Concord University Honor Code:

A Concord University Honor Code was approved by students, staff, faculty, administration, and the CU Board of Governors. The Code states:

"As a member of the Concord University Community I will act with honesty and integrity in accordance with our fundamental principles and I will respect myself and others while challenging them to do the same."

The Honor Code is intended to unite the Concord community behind a culture of honesty, integrity, and civility.

Class/Online Attendance Policy:

Regular class attendance is part of a student's academic obligation at Concord. Irregular attendance may affect academic performance adversely and is detrimental to the atmosphere of a class. (See University Catalog Academic Policies and Procedures.)

Emergency Alert System:

In an effort to increase safety and security on our campus, Concord University encourages everyone to register for instant text message alerts. Alerts will only be used for security and safety notices. All students, faculty, and staff are eligible to receive text message alerts on their cell phones or email alerts. Please contact the IT Help Desk for further assistance (304-384-5291).

Emergency Information:

Emergency/courtesy telephones are located at the main entrance of each residence hall and at various other locations on campus. Emergency telephones can be identified by the flashing blue light and will provide the user with a direct link to Public Safety at the press of a button. To report an on-campus emergency, call 304-384-5357 or 911. The Office of Public Safety is located on the bottom floor of the Rahall Technology Center. For further emergency information go to:

<http://www.concord.edu/administration/office-public-safety>.

Inclement Weather Policy:

As a general policy, the University will remain in normal operations during adverse weather conditions. In the event of severe weather conditions, the following may occur:

University Closure

No students or employees are to report.

Classes Cancelled

Students do NOT report BUT employees are expected to report to work at their normal time.

Operating on an Inclement Weather Delay

Under this schedule, all 8 a.m. classes will start at 10 a.m. Students and faculty will follow the Inclement Weather Schedule. (See <http://www.concord.edu/emergency-alerts> for Athens/Beckley Inclement Weather Schedules.)

**Announcements invoking the late schedule or other options referenced above are aired on area radio and television stations and are sent as text and email messages to those enrolled for this service. Announcements of campus closures and schedule delays are also posted on the CU webpage. Log on to <http://www.concord.edu> → Everyday Access → Emergency Alert System.*

Student Conduct:

In classrooms, online, laboratories, and during any activities that are part of course requirements, students are expected to observe reasonable rules of conduct.

Sexual Harassment & Assault:

Federal law, Title IX, and Concord University policy prohibits discrimination, harassment, and violence based on sex and gender (Including sexual harassment, sexual assault, domestic/dating violence, stalking, sexual exploitation, and retaliation). If you or someone you know has been harassed or assaulted, you can receive confidential counseling support through the Concord University Counseling Center (304-384-5290). Alleged Violations can be reported non-confidentially to the Concord University Title IX Coordinator at 304-384-6327 or titleix@concord.edu. Reports to Campus Security can be made at (304-384-5357). As an employee at Concord University, **I am a mandatory reporter** which means I must report any sexual misconduct I am made aware of. This includes verbal or written (such as in an assignment) disclosures of sexual harassment or sexual assault.

Technology Services:

Contact the CU Help Desk at extension 5291 from campus or 304-384-5291 off campus. You may also e-mail cuhelpdesk@concord.edu.

Academic Resources:

The Academic Success Center is ready to assist any student with academic or personal concerns, tutoring, study skills, time management, and much more. The Academic Success Center is located in Suite 243 (Atrium) of the Rahall Technology Center. Students can stop by the ASC Monday through Friday, 8:00

am until 4:00 or by appointment. The ASC may be reached by calling (304) 384-6074, (304) 384-6298, or asc@concord.edu. Website: <http://hub.concord.edu/academicsuccess/> The drop-in tutoring schedule is posted online: <https://apps.concord.edu/tutoring/>. Smarthinking— online, and on-demand tutoring—is available on Blackboard at elearn.concord.edu.

Syllabus Disclaimer

"This syllabus is subject to change based on the needs of the class. Please check it regularly."