

BIOL/CHEM 4242 LABORATORY FOR BIOCHEMISTRY

Fall 2014 Course Syllabus

Instructor: Zerong Wang

Office: Bayou 3525-13

Phone: 281-283-3795

E-mail: wang@uhcl.edu

Office hours: Wednesday 1300- 1500, or by appointment

Class: Monday 8:00-11:50 am

COURSE OBJECTIVE: To provide students with an introduction to methods employed in biochemical research.

PREREQUISITE: Organic Chemistry I

PREREQUISITE OR CO-REQUISITE: Biochemistry I

Learning Outcome

- * Understand the concept of concentration, acid/base, pH and buffer. Know how to prepare a solution of known pH, either of a pure acid, base, or buffer.
- * Know the concept of centrifugation, and use the centrifugation as a tool for the purpose of separation and purification of biomaterial and biomolecules.
- * Understand the concept of protein quantification. Know the advantages and disadvantages of various protein quantification methods and learn to choose the appropriate method for a given protein concentration.
- * Comprehend the principle of gel permeation column (GPC) chromatography, as well as other related column chromatography methods that are applied to separate biomolecules. Learn to construct a graph to estimate the molecular weight of protein using the data of GPC.
- * Understand enzyme kinetics; know how to determine the type of enzyme-catalyzed reactions, as well as the behavior of inhibitor for the kinetics. In addition, students are also required to know the effect of temperature and pH on enzyme kinetics.
- * Comprehend the concept of SDS-PAGE, & know to determine the size of protein according to the protein ladders.
- * Learn DNA separation methods as well as characterization tools. Understand the concept of PCR and the roles of restriction endonucleases and plasmid DNA in biotechnology.

6-Drop Rule Limitation

Students who entered college for the first time in Fall 2007 or later should be aware of the course drop limitation imposed by the Texas Legislature. Dropping this or any other course between the first day of class and the census date for the semester/session does not affect your 6-drop rule count. Dropping a course between the census date and the last day to drop a class for the semester/session will count as one of your 6 permitted drops. You should take this into consideration before dropping

this or any other courses. Visit www.uhcl.edu/records for more information on the 6-drop rule and the census date information for the semester/session.

Fall 2014 Course Schedule

Date	Exercise	Description	Due Date
08/25		Introduction to the laboratory	
09/08	1	Acids, Bases and Buffers	09/15
09/15	2	Cellular fractionation- density gradients	09/22
09/22	3	Proteins- Quantification	09/29
09/29	4	Proteins- separation by chromatography	10/06
10/06	5	Proteins- separation by SDS PGAE	10/13
10/13		Mid Term Exam	
10/20	6	Enzymes--isolation and purification	11/17
10/27	6	Enzymes—quantification and characterization	11/17
11/03	6	Enzymes—physical and kinetic characterization	11/17
11/10	6	Enzymes--further characterization and analysis	11/17
11/17	7	DNA isolation	12/08
11/24	7	DNA Digest and amplification	12/08
12/01	7	DNA Analysis-Agarose gel separation	12/08
12/08		Final Exam	

- **MODIFICATIONS TO THE SCHEDULE WILL BE MADE WHEN NECESSARY!**

TEXTS: Laboratory instructions will be provided at Blackboard a week before the lab is to be conducted. In addition, R. F. Boyer, Modern Experimental Biochemistry, 3rd Edition, Benjamin Cummings, is recommended, not required.

GRADING: Your grade will be made up of the following components:

1. TESTS (35%)

There will be two tests given at the indicated times. Students are responsible for all material in handouts, for all problem assignments, for designated reading and for information presented in class.

2. LABORATORY REPORTS (50%)

A laboratory notebook will be kept, and reports will be turned in on the dates as noted on the preceding page. Students will work in pairs for the purposes of data collection; however, ***each student will prepare a separate report.*** You may discuss your results with other members of the class but you **must** write your own report

independently (duplicated reports or similar reports with simple rephrasing of other reports will not be assigned for any credits). The reports will count 50% of the final grade. Although only one lab report is required for lab 6 and 7, respectively, the score for these labs are equivalent to 4 and 3 regular lab reports. The three lowest grades of lab reports will not be considered to calculate your overall points in lab report (if lab 6 is corresponding to the lowest score, only three out of the four equivalent scores will be dropped provided that all other lab reports have been turned in with higher scores and all contents in the four weeks experiments have been discussed in lab 6). There will be **no laboratory make-ups**.

Submission and Late Paper Policy

Lab reports must be turned in at the beginning of the lab period on the due days. The grades for reports received after the due days will be reduced by 10% of the merits after 8:20 am on Monday. An additional 10% will be reduced for every day that the report is turned in after Monday of the same week (i.e., your lab report will be worthy of only 30% of the original value if it were late for a week).

Neatness and Readability

When preparing your lab reports, remember that neatness and readability (and, therefore, comprehensibility) are of the utmost importance to your audience (the instructor). Reports must be **typed**, although graphs may be done on finely ruled scientific or engineering graph paper.

Components of Lab Reports

The components in the lab report will be weighed in different percentage values, i.e., Title/author/date: 7%; Abstract: 10%, Introduction: 10%; Material & Methods: 3%; Results: 20%; Discussion: 30%; Conclusion: 5%; References: 5%; Readability: 10%.

3. CLASS PREPARATION, PARTICIPATION & PERFORMANCE (5%)

You are expected to participate actively in all laboratory exercises and demonstrate a reasonable level of proficiency in the laboratory procedures that you will be using each week (e.g., pipetting solutions, operating the spectrophotometer, using the various centrifuges, etc.). It is your responsibility to develop your laboratory skills! It is also your responsibility to come to lab prepared and to work with your lab partners so that your experiment is performed safely, correctly, and in a timely fashion.

You should prepare the lab material in advance, and make the table sheet ready for recording the experimental results. If you really prepare the lab, you should not feel nervous during the experiment. Mistakes during experiments or fail to collect data will all affect your performance score. You must show your lab preparation (such as prepared tables or data sheets for recording your experimental results, what you can learn from that particular lab, what kinds of thing should be taken care of, etc.) before each class. Students not finishing that part will be asked to complete before going to lab, and 2 points will be taken away from their final score. Your instructor's subjective evaluation of your participation and demonstration of laboratory skills will count for 5 points toward your overall performance score.

Finally, students are required to keep a neat laboratory notebook and to clean the entire laboratory before leaving the lab (safety rule #7).

4. CLASS ATTENDANCE: (10%)

Your actual attendance will be recorded in the provided signing sheet. Regardless of whatever reason applies, if you miss the class, your attendance points will be lowered accordingly.

The lab sessions begin promptly at the listed times, and it is essential that you be there. Arriving late will often mean that you have missed some key instructions, which in some cases may be related to safety procedures. If you come to class late more than 20 minutes or leave the class 20 minutes earlier than the completion of the experiment, you will receive a conduct mark; likewise, being late for class more than an hour or leaving the lab an hour before the completion of lab work will be assigned three conduct marks. **Two conduct marks** will lead to a deduction of 1 point from your performance score.

To make this policy clear, you will be given 13 signing sheets throughout the semester, if you miss one class, then you can only receive a maximal of 9.2 (=12/13×10) points of attendance score. If you have two conduct marks, then you will earn a maximal of 4 points of performance score.

Your final grade will be determined according to the following percentage range.

Score	Grade	Score	Grade	Score	Grade
93.0-100	A	90.1-92.9	A ⁻	85.1-90.0	B ⁺
80.1-85.0	B	75.1-80.0	B ⁻	70.1-75.0	C ⁺
65.1-70.0	C	60.1-65.0	C ⁻	50.1-60.0	D
< 50	F				

The instructor reserves the option of adjusting the grade cut-offs to lower scores if necessary.

IMPORTANT: These safety rules must be followed:

1. Goggles or safety glasses must be worn at all times!
2. Closed-toed shoes must be worn; lab coats are recommended.
3. No eating, drinking or smoking in the laboratory.
4. When students are performing experiments do not purposely distract them.
5. No mouth pipetting; use a bulb or automatic pipetter.
6. Protective gloves are available in the lab; use them when necessary.
7. You are responsible for maintaining the laboratory. **All** laboratory benches and equipment must be **clean** at the end of the period; this is considered part of proper laboratory technique and as such affects your grade!

The Academic Honesty Policy at UHCL (found on page 101-103 of the 2014-2015 catalog) states: “Academic honesty is the cornerstone of the cornerstone of the academic integrity of the university. It is the foundation upon which the student builds personal integrity and establishes a standard of personal behavior”.

The Honesty Code of UHCL states:

“I will be honest in all my academic activities and will not tolerate dishonesty.” Because honesty and integrity are such important factors, you should be aware that failure to perform within the bounds of these ethical standards is sufficient grounds to receive a grade of “F” in this course and be recommended for suspension from UHCL.

Reminders & Tips

Overall, a few important things you must keep in mind to succeed this course, they are:

- It is your responsibility to come for class on time. There is no any negotiation about the scores. Coming to class 20 minutes late or leave class earlier than 20 minutes will count to your performance score.
- Develop a good attitude. Biochemistry Laboratory can be both fun and interesting if you allow it to be.
- Read the assigned material before each class, read it again during your lab report preparation, and read it a third time before examination.
- Form a study group with a few classmates and work problems together at least weekly.
- Get help *early* with concepts you don't understand. Ask a classmate or ask me during class or office hours.
- Writing lab report promptly is much better than holding to the last minutes. Previous experiences indicate that students always turn in late lab reports finally end up with very low grades.
- It is your responsibility to keep track of your performance and your score. You should make your own decision on whether or not continuing this course or dropping this class! Your instructor will not and has never provided any advice or suggestion on your course plan; in addition, your instructor will not discuss this topic with you.
- Your instructor will not assign any incomplete grade for any of you if you could not pass the class and have not dropped the class before the deadline, unless you have a severe health problem. Even this situation applies, you must finish the uncompleted work within one week to get the final grade, i.e., your incomplete grade is conditional and cannot carry on to the next semester.
- Your assigned grade is non-negotiable. No one can change the grade, no matter what kind of excuses is tried.
- If you could not come for the tests, you will be affected for both the attendance rate and final score. You might get the permission from your instructor to take the make-up test if you could provide a reasonable excuse for not coming to the test. However,

the make-up test will be scheduled within one-day period after the regular test time, and the make-up test will be different and tough. If you know that you are going to miss an exam it would be to your advantage to take the exam early, since I am usually at the University on the day of the exam.

- You may receive emails from your instructor from time to time, and it is your responsibility to check your emails. There is not any excuse for the merits of score because of not getting email from your instructor when other students do get. Regularly, your instructor will send the review materials via email.