Biochemistry Laboratory CHE 4350 Fall 2015

Monday 1:00pm-3:50pm Science Building 3099
Course Website: http://bonhamchemistry.com

Instructor: Dr. Andrew J. Bonham **Office Hours:** T,W,&Th 10:00-11:00, W 1:00-3:00
Contact: abonham@msudenver.edu **Office:** SI 3048 and 3027

Why Study Biochemistry?

Biochemistry is the study of the chemical processes of living organisms—both those in the world around us and ourselves. A solid understanding of biochemistry will help you live better by providing a better understanding of how your body works (whether that be in exercise, nutrition, or disease response) and provides insight into the endless, fascinating examples of the beauty and complexity of the living world around us.

What do I expect from you? How can you succeed at this laboratory course?

Biochemistry is a complex topic, and while I believe that every student can succeed at this course, like any challenge, certain expectations must be met for you to succeed.

- Regular Attendance and Daily Practice: Science and math, and especially biochemistry, are their own language, with specialized vocabulary and ways of approaching problems. Just like the study of a foreign language, I expect regular attendance and daily practice. If you cannot commit to thinking about, and solving problems in, biochemistry every day, you will not acquire enough skill to confidently master this topic to the level that you will need for future careers.
- Plan for the Future: I expect you to be aware of the laboratory schedule, and plan accordingly. I expect at least two weeks notification for any content you may miss, and there will not be flexibility on the due date of the formal research lab report. Review the schedule now, and plan for the future.
- Take the lab work seriously. Labs are designed to reflect, as much as possible, real-world laboratory experiences. This is a great opportunity to learn useful skills, but requires careful attention to safety hazards, details of experiments, and awareness of the lab environment.

What can you expect from the instructor?

Much as I have expectations for the students, the instructor will meet a set of expectations as well (and please politely notify me if I'm not meeting them). I will give clear, relevant, on-time lectures. I will provide clear assignments, clear and fair grading policies, and relevant practice problems. I will offer reasonable availability outside of class (such as office hours). I will encourage student participation. I will always encourage your understanding and enjoyment of the science of biochemistry.

Course Description:

CHE 4350. This course introduces basic techniques and instrumentation of biochemical research and offers opportunities for independent work in both the library and the laboratory.

Required Materials:

- Biochemistry Laboratory Manual CHE 4350, Bonham, A., Ragan, E., Drotar, A., and Elkins, K., Chemistry Department, Metropolitan State University of Denver, Denver, CO, 2013. Available for download online at http://bonhamchemistry.com
- Laboratory Notebook (not spiral bound or carbon-copy)
- Scientific or Graphing Calculator (no cell phones, laptops, tablet computers, or other web devices).

Quizzes:

Quizzes will be given promptly at the beginning of each class. The quizzes will consist of 5-multiple choice questions covering material from the upcoming lab as indicated on the schedule. Review the lab manual and accompanying material before class! There will be 14 quizzes this semester. There will be no make-up quizzes, however, the one lowest quiz grade or an absence will be dropped; your grade will be computed based on 13 quizzes. Do not be tardy or you may miss the quiz. All subsequent missed labs/quizzes beyond the one drop will result in a zero for that lab/quiz. You are still responsible for any material covered in the lab you missed for the quiz the following week if you miss a lab.

Lab Notebooks

You will be expected to keep an organized and clear lab notebook. Anything done in lab should be recorded—sample problems, calculations, observations, and results. For each experiment, there should be a separate page (or pages) showing this information. All observations should be immediately copied into your lab notebook. Tasks that must be done on computer (such as graphs) should be printed out and pasted into the notebook. You must answer experimental questions/analysis in your lab notebook. Your lab notebook is a considerable amount of your grade, so please take it seriously and professionally.

Lab Reports:

Lab reports are due for completed experimental modules on the week following that module's completion (see schedule). All lab reports should be typed and data should be analyzed using an appropriate spreadsheet/graphing program.
There will be 3 lab reports during the semester (as well as a final report, see below). As such, they are worth a considerable amount of your grade, and you should take care to put effort into making them professional, appropriate, and high-quality.
Laboratory reports must be concise, well-organized and be presented well and follow the prescribed ACS Biochemistry format (see handout/rubric). Do not round your data; record the exact precision in your lab report that you were able to record in the laboratory depending on the measuring instrument used. Calculated values should follow rules of significant figures. As junior and senior-level students, it is expected that you can evaluate significant figures correctly and points will be deducted for incorrect evaluations of numbers. Please see the instructor for assistance if you have difficulty with this task.

Your lab reports should be typed and should be entirely your own work. Graphs and tables may be done in Excel. Use the best fit line for points to calculate the slope. For all graphs, if you work with a partner, do not hand in photocopy or word-processing replicas of their report materials and call them your own. This is plagiarism. When in doubt, cite your source. Late laboratory reports will be penalized 5 points per day and will not be accepted after 7 days (1 week).

Grade Calculation & Policies:

13 Lab Quizzes (drop one of the 14)	20 %
Lab Notebook	20 %
3 Laboratory reports	60 %
Total	100 %

Points are ***tentative*** and subject to change by the instructor.

Grades will be available at the next regularly-scheduled course meeting. For Finals, final grades will be available from me in person on Friday of finals week. Grades will be available by web and kiosk after the semester at http://connectu.msudenver.edu.
FERPA policies prohibit me from releasing your grades via phone or email unless you register with the Registrar's office and obtain a non-identifying security code.

Administrative Syllabus policies

Students are responsible for full knowledge of the provisions and regulations pertaining to all aspects of their attendance at MSU Denver, and should familiarize themselves with the policies found on the following web site:
https://www.msudenver.edu/handbook/academicpoliciesforstudents/

Students should be aware that any kind of withdrawal can have a negative impact on some types of financial aid, including scholarships. For further information, follow this link: http://msudenver.edu/financialaid/undergraduate/keepingawards/

1. WITHDRAWAL FROM A COURSE https://www.msudenver.edu/handbook/academicpoliciesforstudents/#Withdrawal

2. ADMINISTRATIVE WITHDRAWAL
https://www.msudenver.edu/handbook/academicpoliciesforstudents/#Withdrawal_Due_to_Emergency

3. INCOMPLETE POLICY https://www.msudenver.edu/handbook/academicpoliciesforstudents/#Incomplete

4. ACADEMIC DISHONESTY https://www.msudenver.edu/deanofstudents/studentconduct/academicintegrity/academicdishonesty/

5. PROHIBITION ON SEXUAL MISCONDUCT https://www.msudenver.edu/deanofstudents/studentconduct/sexualmisconducttitleix/

6. ACCOMMODATIONS TO ASSIST INDIVIDUALS WITH DISABILITIES
http://www.msudenver.edu/access/faculty/adasyllabusstatement/

7. CLASS ATTENDANCE ON RELIGIOUS HOLIDAYS
https://www.msudenver.edu/handbook/academicpoliciesforstudents/#Class_Attendance_Holidays

8. STUDENT EMAIL POLICY http://www.msudenver.edu/handbook/generaluniversitypolicies/#Electronic_Communication_Policy

If you have any difficulty accessing the hyperlinks in this document, please inform the instructor.

Syllabus Changes and Policy:

Any changes in this syllabus I may deem necessary during the semester will be announced in class and made available in writing. I reserve the right to revise the syllabus and grading policies at any time.

CHE 4350 Experiment Schedule: (subject to change) **Fall 2015**

Week	Dates	Exercises	Quiz
1	August 17th	• **Module 1: Basic Lab Skills** • Pipetting & Statistics	---
2	August 24th	• Buffer Preparation	• Buffers (1)
3	August 31st	• **Module 2: DNA & Molecular Cloning** • Plasmid Purification • PCR • Assignment of Mini Projects	• Plasmid Purification (2) • PCR (3)
Labor Day	September 7th	---	---
5	September 14th	• Agarose Gel Electrophoresis • Student Mini-Presentations	• Agarose Electrophoresis (4)
6	September 21st	• Bacterial Transformation • Report Discussion & Peer Critique	• Transformation (5)
7	September 28th	• **Module 3: Protein Purification & Characterization** • Cell Lysis and *in silico* Protein Investigation	• Cell Lysis & in silico protein investigation (6)
8	October 5th	• Nickel Affinity Column Chromatography • ***Lab Report due for Module 2***	• Ni Column (7)
9	October 12th	• UV/Vis & Bradford Protein Characterization	• UV/Vis & Bradford (8)
10	October 19th	• SDS-PAGE • Report Discussion & Peer Critique	• SDS-PAGE (9)
11	October 26th	• **Module 4: Enzyme Kinetics** • Optimal Activity of Tyrosinase	• Tyrosinase Activity (10)
12	November 2nd	• Tyrosinase Kinetic Measurements • ***Lab Report due for Module 3***	• Tyrosinase Kinetics (11)
13	November 9th	• Tyrosinase Inhibition	• Inhibition (12)
14	November 16th	• Data Analysis • Report Discussion & Peer Critique	• Data Analysis (13)
Fall Break	Nov 23rd to 27th	--	--
15	November 30th	• Lab Clean Up • ***Lab Report due for Module 4***	• **Lab Final!**