

BIOL/CHEM 327

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Course Information:

- Lectures on M/W/F, 9:10-10am, in PPHAC 116
- Problem Sessions on Thursdays at 10:20am-11:10am in MEMOR 201
- Laboratory on either Thur or Fri at 12:45-3:45 in HOSCI 301

Course Goals

- To understand the chemical basis of the structure and function of the four main groups of biological molecules responsible for cellular function
- To gain hands-on experience with (and understand the basic theory behind) some of the laboratory methods used to isolate and investigate these biological molecules
- To become familiar with a variety of data bases that contain information about the structure and function of these biological molecules (bioinformatics)
- To gain more experience in scientific writing
- To develop more problem-solving and critical thinking in class and in the laboratory

Required Textbook

- Lehninger's Principles of Biochemistry 4th Edition, ISBN: 0-7167-4339-6 by David Nelson and Michael Cox. (2004), Worth Publishers
- Textbook website (free registration!): <http://bcs.whfreeman.com/lehninger/>
- A guide to the textbook is available from the publisher and a copy is in the Chemistry Periodical Room for you to peruse at your leisure.

Other Materials

- Required: A bound notebook for laboratory
- Strongly Recommended: A USB memory stick to save bioinformatics and laboratory data

Black Board Web Site

Throughout the semester announcements, laboratory procedures, problem sets, answer keys, pertinent links, reminders and other material will be posted to the course blackboard page. Please access this page early and often!

Attendance Policy

Your presence is welcome and expected in all course meetings (class, problem sessions, and laboratories). As a reminder, the college policy on attendance can be found at <http://www.moravian.edu/studentLife/handbook/academic.htm>. If you anticipate an unavoidable absence (due to an extenuating and documented* circumstance), please notify the instructor as soon as possible, particularly since makeup laboratories or exams are likely not an option.

Academic Honesty Policy

Please be familiar with the college policy on academic honesty that applies to this course (<http://www.moravian.edu/studentLife/handbook/academic2.htm>). In addition, throughout this course, each student may exchange experimental details and data with her/his lab partner and classmates. However, any work submitted in your name is to be your work alone. You may discuss work with others on assignments and labs, but merely copying answers is not acceptable.

* Your instructor will expect documentation from a health professional or academic dean regarding missed exams or laboratories.

BIOL/CHEM 327**Grading**

Your grade in this course does not depend on the grade of any other student in the class. Instead, your letter grade will be determined by the percentage of total possible points you earn in this course, according to the following scale:

Percentage-Based Grading Scale

Percentile	Letter Grade	Percentile	Letter Grade
93-100	A	73-76	C
90-92	A-	70-72	C-
87-89	B+	67-69	D+
83-86	B	63-66	D
80-82	B-	60-62	D-
77-79	C+	< 60	F

The total number of possible points in this course is *anticipated* to be as follows:

I.	Exams (3@100pts each)	300pts
II.	Quizzes (~5@10pts each)	50pts
III.	Problem Sets (~6@25pts each)	150pts
IV.	Research Writing	150pts
V.	Laboratory	150pts
VI.	Final Exam	200pts
	Total for Course	1000pts

I. Exams: Three 50-minute exams will be given during the semester. These exams are scheduled *in class* on Monday October 2nd, October 30th, and December 4th. **NO MAKE-UP EXAMS WILL BE GIVEN.**

II. Quizzes: Short 10-15 min quizzes will be given periodically during the semester. These quizzes will cover structures and properties of biomolecules and may also contain multiple-choice problems from the lecture material and from the textbook web site.

III. Problem Sets/ Problem Sessions

Weekly problem sessions will meet in the MEMORIAL 201 computer lab and will introduce you to spreadsheet, database and molecular viewing/analysis tools you will need to complete your problem sets. Biweekly problem sets will be assigned, collected, and graded. Due dates and times for each problem set will be posted on the blackboard course page and clearly indicated on each assignment. Late assignments may be accepted but with a penalty to be decided by the instructor (~10% per day deduction until the key is posted).

IV. Research Writing

- Short scientific writing assignments will be given during the first part of the semester. These assignments will be done in the format required by the journal *Biochemistry* (see the journal's "Guidelines for Authors" PDF posted on the blackboard page) and will be based on experiments you perform in the laboratory portion of this course.
- Following feedback on the short assignments, you will be asked to write up a research report for the kinetics laboratory experiment in the format of an accelerated publication for *Biochemistry*. Your manuscript should be typed and include all appropriate data in computer-generated figures with suitable legends. Use of the primary literature (scientific journals, NOT web pages) is crucial to set the context of your work. Deadlines for this paper will be discussed and posted later in the semester.

BIOL/CHEM 327**VI. Final Exam**

This exam will be cumulative and given at a time designated by the Registrar.

V. Laboratory

Your performance in, analysis of, and scientific writing about laboratory experiments is the basis for a significant portion of your assessment in this course (30% of your course grade). Since I can only assess your work in lab if you are present, and you will only have writing material for your research assignments if you actually perform the experiments, you should be present for and intellectually active every laboratory meeting of this course. Regarding laboratory absences, please see the attendance policy above.

Part of your lab grade will come from how well you **perform** in lab. Factors affecting this grade include your preparation, safety, work efficiency/technique, and equal task-sharing with your partner in the lab. To prepare for lab each week, please:

- Read each experiment before coming to lab (procedures will be posted to course web site ahead of time)
- Have a general idea of what you will do in lab that day (and in what sequence)
- Look up the MSDS (see blackboard link) for each potentially hazardous chemical that you have not worked with before

Short pre-lab quizzes may be given by the instructor throughout the semester as deemed necessary.

Your laboratory **notebook** serves many purposes. It is a diary of your time spent in lab, and a complete record of your experimental procedure, data, observations and ideas. Proper documentation of your work could provide the information needed for publishing a paper, writing a thesis, obtaining an award (NOBEL ! \$), getting a raise from your employer (\$), or receiving a patent (\$ \$). While experiments in this lab are unlikely to result in any of the above, we must practice! Please observe the following in your laboratory record-keeping (any of these aspects are fair game for assessment):

- Use a bound notebook. Do not remove or skip any pages.
- Write legibly in pen. Do not white-out or erase any mistakes. You may cross-out erroneous entries but they must remain legible. Be sure to explain any such errors. Keep your notebook as neat as possible under laboratory conditions. Your instructor understands that your notes may be subject to water-blot, crossed-out mistakes, etc.
- Keep a table of contents. Reserve the first 4-5 pages of your notebook for this. Update it frequently.
- Number all pages.
- Write directly into your notebook. When preparing for lab, reading literature for lab, and during lab, be sure to take notes directly into your notebook. A clear outline format in your notebook, without full sentences, is just fine. Be concise!
- Include references. If you find an important/pertinent piece of information someplace else (such as in a book, catalogue, journal article, or on a reputable web site) write the reference information directly into your notebook – Include enough information so you could find it again if you had to!
- Format. The notebook entry for an experiment will generally include:
 - TITLE, DATE, LAB PARTNER.
 - OBJECTIVES/GOALS. Outline the important aspects behind the experiment, its design, and what you hope to accomplish
 - PROCEDURE. Outline what you DID in lab, not what you SHOULD HAVE done. For procedure details you may cut and paste any lengthy portions of the lab handout, but be sure to note any modifications of the written procedure directly into your notebook.
 - RAW DATA. Record all data directly into your notebook and never on loose paper. Data should be clearly and neatly labeled.

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- **RESULTS.** Show sample calculations. Tape data tables and graphs into your notebook. Label all data tables and graphs clearly, including relevant units. To make your life easier, write the file name corresponding to each spreadsheet in your notebook.
- **DISCUSSION.** This is the section for critical analysis. You can list the main conclusions (full sentences not necessary!) and support them by referring back to specific results. Try to list potential sources of error and predict how each would affect your results. Where appropriate, list further work that could be done and briefly explain its impact on the study.

TENTATIVE Reading/Lecture/Laboratory Schedule

<u>Week of....</u>	<u>Lecture Topic</u>	<u>Chapters in Text</u>	<u>Laboratory</u>
8/28	Introduction&Water	1&2	Pipettors & EXCEL
Labor Day – NO CLASS			
9/6	Buffers,Amino Acids&Peptides	3	Amino Acids
9/11	Biochemical Techniques	3	Protein Conc.
9/18	Protein Structure	4	Lysozyme#1
9/25	Protein Structure	4	Lysozyme #2
EXAM#1 - Monday 10/2			
10/2	Protein Function	5	Lysozyme #3
FALL BREAK			
10/11	Protein Function	5	Lysozyme #4
10/16	Enzymes	6	Kinetics#1
10/23	Enzymes	6	Kinetics#2
EXAM#2 – Monday 10/30			
10/30	Carbohydrates	7	Kinetics#3
11/6	Carbohydrates	7	Carbs#1
11/13	Nucleic Acids	8	Carbs#2
11/20	Nucleic Acids	8	NO LAB
THANKSGIVING BRK			
11/27	Lipids	10	DNA#1
EXAM#3 – Monday 12/4			
12/4	Lipids	10	DNA#2
12/11	Membranes	11	
FINAL EXAM			

