Biochemistry (Chem/Biol 371) Fall 2005

Dr. Dan Gretch

Tues. 8:40-12:00 or 12:10-3:30 Rm. 123 Science Hall

Office hours: Rm. 245 Science Hall
MWF 2:00-3:00
(or when my door is open or by appointment)
Ph. 657-2024 (W) and 252-4368 (H) before 10:00 PM please
Email: dgretch@msubillings.edu

Course Emphasis: This course will emphasize the experimental basis for the study of biochemistry. Students should be taking BIOL/CHEM 361 while enrolled in this course. This course will extend your understanding of how the chemistry of life is studied. You will learn the theory behind many investigative approaches used in biochemistry today. More importantly, you will apply these techniques to the study of biochemical processes yourselves.

Course Goals:

1) To establish a true biochemistry learning community. This means we are all important players in the learning process. We share the responsibility to:
a) come to class prepared
b) actively participate by asking questions and discussing topics
c) commit to learning as much as possible both as individuals and as a group

2) To establish structural and multidimensional literacy in biochemistry.
Nominal literacy -- Many people are here!! They understand that something is biochemical in nature but are naive in their understanding and have many misconceptions.
Functional literacy -- Many people are here!! They use biochemical vocabulary, define terms, but most things are memorized.
Structural literacy -- We want to be here!! Students understand biochemical concepts and procedures for studying biochemistry. They can explain these concepts in their own words.
Multidimensional literacy -- We want to be here!! Students understand the relationship between biochemistry and other disciplines and the relationship between biochemistry and society.

Assessment of your learning:

To determine if you are meeting the goals of this course and learning biochemistry, I will use a few different assessment methods. As much as is possible we will discuss the ideas we are covering so you can verbally convey your understanding (or misunderstanding). This will allow me to provide immediate feedback to you. Such forms of assessment will not count towards your grade for the course.
Written (and perhaps oral) assessment will be used to formally determine how well you are understanding the material we are discussing. This assessment will take the form of written/oral exams. I will use a combination of matching, multiple choice, true and false, short answer, essay, and problem solving questions in these exams. The schedule for the exams is found within this syllabus. Homework problems and assessment of your laboratory notebook may also be used to monitor your progress, although they will not be used to determine your grade.

**Attendance:**

This course is designed to be interactive. Students will be expected to collaborate both inside and outside the classroom, therefore attendance is very important. If you miss a lab, it’s like missing an entire week of classes. There is no extra credit work in this class.

Make-up exams: An unauthorized absence from an exam will result in a grade of zero for the exam unless you have a signed excuse from an MD, law enforcement officer, or next of kin. There are a few (not many) valid reasons to miss an exam. If there is a valid reason for you to miss an exam, it is YOUR responsibility to notify me BEFORE the exam and complete the work prior to the exam if at all possible. Make-up exams are always harder than the original exam!

**Exams and points:**

- Beta galactosidase poster 50 pts.
- Tyrosinase poster 50 pts.
- Beef liver write up 50 pts.
- Final exam 150 pts.

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Total 300 pts.

**Grading:**

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<th>Percentage</th>
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<tr>
<td>90-100%</td>
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<td>Below 50%</td>
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***Final grades are based on total lab points. I reserve the right to utilize a grading curve to determine your final grade. I will not curve downward.
Text and readings:

Gretch, D.G. Laboratory Notes for Biochemistry 371, 2005. (Book Depot)

Laboratory notebook. (Mead composition notebook) quadrille

Required readings will be assigned or presented in class in advance. These readings will be part of the basis for classroom discussions and will be tested over as well. Labs should be read prior to the day they are performed when available to you.

Tentative topics to be covered in Biochemistry Lab
BIOL/CHEM 371

Week 1 Sept. 13th
Introduction to the course

Perform Exercise 1 Using RasMol (RasWin or RasMac)

Week 2 Sept. 20th
Introduction to the Biochemistry Laboratory
Laboratory safety
Laboratory notebooks

Perform Exercise 2 Using the Computer in Biochemical Research

Week 3 Sept. 27th
General Laboratory Procedures
Water
Glassware
Preparation and storage of solutions
Transfer of liquids
Dialysis and filtration

Perform Exercise 3 Making Solutions
pH Measurement and Buffers
Week 4  Oct. 4th
Spectrophotometry
  UV-Visible spectrophotometry
  Fluorescence spectrophotometry

Perform Exercise 4  Using the UV-Visible spectrophotometer to measure protein concentration and analyze samples

Week 5  Oct. 11th
Separation and Purification of Biomolecules by Chromatography

Perform Exercise 5  Beta Galactosidase Project
  Background and Designing Experiments

Week 6  Oct. 18th
Characterization of Proteins and Nucleic Acids by Electrophoresis

Continue Exercise 5  Beta Galactosidase Project Part 1

Week 7  Oct. 25th

Continue Exercise 5  Beta Galactosidase Project Part 2

Week 8  Nov. 1st
Elements of a poster

Finish Exercise 5  Beta Galactosidase Project and posters

Week 9  Nov. 8th

Begin Exercise 6  Kinetic Analysis of Tyrosinase

Week 10  Nov. 15th
Centrifugation

Continue Exercise 6  Kinetic Analysis of Tyrosinase  and Write-up
Week 11  Nov. 22nd

Perform Exercise 7  Isolation of mitochondria from beef liver using differential centrifugation

Week 12  Nov. 29th
Using Radioisotopes in biochemical research

Finish Exercise 7  Isolation of mitochondria from beef liver using differential centrifugation

Week 13 Dec. 6th

Exam  (Cumulative)