

General Biochemistry - Metabolism Spring 2016

Instructor: Lawrence K. Duffy, 246 WRRB , lkduffy@alaska.edu, 474-7525

Office Hours: Wednesday and Friday following lectures. However students are encouraged to contact the instructor by phone or email at any time

Lecture: Monday, Wednesday, Friday, 8:00 am - 9:00 am, Murie Auditorium

Required Textbook:

Biochemistry Concepts and Connections

Dean R Appling, Spencer J Anthony-Cahill and Christopher K. Mathews

Pearson

ISBN-13: 978-0321839923

Recommended:

Molecular Biotechnology

Carolyn A. Dehlinger

Jones and Bartlett Learning

ISBN-13: 9781284031409

Course

This 3 credit course will discuss the basic biochemistry components of metabolism. Topics addressed include protein, lipid, carbohydrate and nucleic acid structure, amino acid metabolism, glycolysis and oxidative phosphorylation and metabolic cycles.

Course Goals:

- Develop an overview of the biochemical basis of metabolism and underlying structure, function and regulation of enzymes.
- Be able to explain the molecular basis of disease and cellular signaling.

Learning Outcomes

1. Understand structure-function relationships of proteins, and enzymes.
2. Comprehend the concept of metabolic pathways.
3. Discuss biomedical/disease-related aspects of topics.
4. Generalize the concept of signal transduction.

Instructional Methods:

The teaching methods employed in this course will consist of lectures by the Instructor. It is imperative that reading of sections is done according to the lectures.

Grading

Exams: There will be 3 term exams (100 points each) and a final exam (100 points).

Quiz/Participation: **Class participation** in the form of discussion will be included in the final grade as extra credit. This entails an active involvement in the regular lecture materials discussed (100 points).

The overall grade will be based upon a total of 400 points.

Term Exam I	100 Points
Term Exam II	100 Points
Term Exam III	100 Points
<u>Final Exam</u>	<u>100 Points</u>
Sub total	400 Points
Quizzes	100 Points
Total	500 Points

Course Policies

Attendance: Regular student attendance is expected to ensure consistent group activities and discussions.

Exams: Four exams will be given. These exams will be a combination of multiple choice/short answer and essay questions (take home or in class). Makeup exams will only be allowed with pre-approval of the instructor or with an acceptable, documented reason such as unexpected illness, family emergencies or other unavoidable events.

Quizzes: Students will receive adequate preparation time.

Participation: Class participation entails an active interest aside from paper discussion/presentations. This includes but is not limited to answering questions during lectures, asking for clarifications, or contributing to ad hoc discussions.

Ethical Considerations: The Chemistry "Department Policy on Cheating" is as follows: *"Any student caught cheating will be assigned a course grade of F. The student's academic advisor will be notified of this failing grade and the student will not be allowed to drop the course."*

Plagiarism Policy

Plagiarism is defined as the use of "other" intellectual property without proper reference to the original author.

Intellectual property includes all electronic (Internet), spoken or print media. Students are expected to cite all sources used in oral and written presentations. Cases of plagiarism will be taken seriously with a grade 0 for the particular assignment. Severe cases may be referred to the Department Chair or Dean or class failing considered.

Support Services

Support services will be provided by the University of Alaska Library system, online resources and the instructor.

Additional services are available through Student Support Services (<http://www.uaf.edu/sssp/>) at UAF.

Disabilities Services

Students with a physical or learning disability are required to identify themselves to Mary Matthews in the Office of Disabilities Services (203 WHIT, 474-7043) located in the Center for Health and Counseling in order to receive special accommodations. The student must provide documentation of the disability. Disability Services will then notify me of special arrangements for taking tests, working homework assignments, and doing lab work.

See academic calendar or the UAF website for final Exam dates and other important dates.

Lecture	Chapter	Topic
1	Chapter 1	Biochemistry, the Unity of Life
2	Chapter 1	Prebiotic Evolution, Organelles
3	Chapter 2	Water, Weak Bonds, Hydrophobic Effect
4	Chapter 2	PH, Henderson-Hasselbalch Equation
5	Chapter 3	Free Energy
6	Chapter 3	Free Energy in Biological Systems
7	Chapter 5	Amino Acids and Peptide Bonds
8	Chapter 5	Protein Sequence and Homology
9	Chapter 5	Protein Purification
10	Chapter 6	3-D Structure of Proteins
11	Chapter 6	Quaternary Structure of Proteins
12	Chapter 7	Protein Function: Antibodies
13	Chapter 7	Hemoglobin
14	Chapter 7	Myosin
15		EXAM 1 Handout
16	Chapter 8	Biological Catalysts
17	Chapter 8	Examples
18	Chapter 8	Vitamins and Metals
19	Chapter 8	Kinetics
20	Chapter 8	Inhibition
21	Chapter 9	Regulation
22	Chapter 9	EXAM 2 Handout Carbohydrates
23	Chapter 9	Glyco Proteins
24	Chapter 10	Lipids
25	Chapter 10	Lipid Types
26	Chapter 10	Membrane Structure Function
27	Chapter 10	Membrane Proteins as Transporters
28	Chapter 10	Ion Transporters
29	Chapter 11	Exam 3 Handout Metabolism: Thermodynamics and Coupling Design
30	Chapter 12	Glycolysis and Energy Change
31	Chapter 12	Glycolysis 2
32	Chapter 12	Gluconeogenesis 1
33	Chapter 12	Gluconeogenesis 2
34	Chapter 13	Oxidation Pyruvate
35	Chapter 13	Citric Acid Cycle
36	Chapter 13	Organization of the Cycle
37	Chapter 13	Human Disease
38	Chapter 14	Electron Transport
39	Chapter 14	Oxidative Phosphorylation
40	Chapter 14	Regulatory Control
41	Chapter 14	Reactive Oxygen Species
42	Chapter 16	Fatty Acid Oxidation
43	Chapter 16	Biosynthesis of Fatty Acids
44	Chapter 16	Biosynthesis of TG
45	Chapter 18	Urea Cycle
46		Final Exams see UAF website for date and time

