

General Biochemistry - Metabolism

Spring 2018

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, Reichardt 201

Required Textbook:

Biochemistry Concepts and Connections

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

Pearson

ISBN-13: 978-0321839923

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 and receptors.
- Be able to explain the molecular basis of disease and cellular signaling.

Learning Outcomes

1. Understand structure-function relationships of proteins, lipids and carbohydrates.
2. Comprehend the concept of metabolic pathways.
3. Discuss biomedical/disease-related aspects of protein function.
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 4 term exams (100 points each) and a final exam (100 points).

Participation: ***Class participation*** in the form of discussion will be included in the final grade as extra credit. This entails attendance and active involvement in the regular lecture materials discussed.

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
Term Exam IV	100 Points
<u>Final Exam</u>	<u>100 Points</u>
Subtotal	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
2/3	Chapter 1	Prebiotic Evolution, Organelles
4	Chapter 2	Water, Weak Bonds, Hydrophobic Effect
4/5	Chapter 2	PH, Henderson-Hasselbalch Equation
6	Chapter 3	Free Energy
6	Chapter 3	Free Energy in Biological Systems. EXAM 1
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 1 and 2
14	Chapter 7	Hemoglobin and Myosin
15		EXAM 2
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	Carbohydrates EXAM 3
23	Chapter 9	Glycoproteins
24	Chapter 10	Lipids
25	Chapter 10	Lipids
26	Chapter 10	Membrane Structure Function
27	Chapter 10	Membrane Proteins
28	Chapter 10	Ion Transporters
29	Chapter 11	Metabolism: Thermodynamics and Coupling Design EXAM 4
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		Final Exams see UAF website for date and time