

**Course Syllabus**  
**Chem 451: General Biochemistry**

**Course Name:** Chem 451: General Biochemistry-Metabolism. (3 credits)

**Prerequisites:** Chem 322, Chem450, Chem 331 recommended.

**Location:** Reichardt Building Rm 204

**Meeting Time:** MWF 9:15-10:15

**Blackboard Link:** <http://classes.uaf.edu>

Please note: Check your blackboard information – **particularly your e-mail address**. Important course information and reminders will be e-mailed via this system. All course materials will be available through Blackboard. Since your grades will also be posted, please do not share your user id or password.

**Instructor:** Dr. Marvin Schulte

**Office Hours:** 10:15AM – 12:00PM MWF (other times by appointment).

**Office:** Department of Chemistry and Biochemistry  
Reichardt Building  
Room 184

**Research:** Arctic Health Research Building. Office: Lab: Rms 227 and 228

**Phone:** 907 474-5237 (office), 907 474-5748

**E-mail:** [ffmks@uaf.edu](mailto:ffmks@uaf.edu)

**Preferred Contact Method:** e-mail

**Text and Reference Materials:**

**Primary text:**

**Lehninger; Principles of Biochemistry 4<sup>th</sup> or 5<sup>th</sup> ed.**

**Author: David L. Nelson and Michael M. Cox**

**W.H. Freeman and Company**

**ISBN: 0-7167-4339-6 (4<sup>th</sup> ed) or 0-7167-7108-1 (5<sup>th</sup> ed).**

**Publication Date of 5<sup>th</sup> ed: 2008**

**Please note: You may use the 4<sup>th</sup> edition if you wish but you should be advised that the 5<sup>th</sup> edition of Lehninger includes many updated sections and is recommended.**

**Primary Literature and review articles will be assigned as appropriate.**

**Course Description:**

Chemistry of biomolecules with emphasis on the bioenergetics and control of metabolic pathways via regulation of specific enzymes.

**Specific Coverage:**

- I. Proteins, protein structure and mechanism.
- II. Enzyme mechanism and Enzyme kinetics
- III. Metabolism: Carbohydrates, conversion of sugars, anaerobic and aerobic metabolism. Fat catabolism. Amino acid degradation.
- IV. Anabolic Pathways: Carbohydrates, fats and lipids, amino acids and steroids.

**Course Goals:**

Develop an understanding of the chemistry of key biological molecules. Interpret biological pathways in terms of thermodynamics, chemistry, regulation and protein mechanisms and apply these skills to the understanding of novel pathways. Read and evaluate current articles in primary biochemistry literature pertaining to biological chemistry.

**Learning Outcomes**

1. Identify the levels of structure in proteins and describe the stabilization of these structures.
2. Describe the structure and mechanism of representative enzymes in biochemical pathways.
3. Interpret plots of enzyme kinetic data.
4. Describe representative mechanisms of enzyme catalysis
5. Describe the primary catabolic and anabolic pathways pertaining to the following molecular classes:
  - a. Carbohydrates
  - b. Fats and lipids
  - c. Amino Acids
  - d. Steroids
6. For each pathway in 5, identify the key regulatory points, the energetics of the reactions and the key chemical transformations involved.
7. Read and interpret scientific articles in biochemistry.

## **Instructional Methods:**

The course will be taught using multiple instructional methods. These methods will include lecture, group discussion and oral presentations with an associated critical discussion.

Typically, course topics will be introduced via a 2-3 lecture format incorporating interpretive discussions. Directly following the lecture presentation, students will receive an article from the primary literature that either illustrates current research into the topic or explore a related or relevant additional concept. Literature discussions will utilize small group discussions following by classroom presentation and discussion.

## **Course Policies:**

### **Attendance:**

Due to the dependence on group activities and discussions, students are expected to attend class regularly. Students are expected to participate actively and will receive a participation score as described under evaluation. If you are unable to attend class you should contact the instructor by email (preferably before or very soon after the class).

### **Exams:**

Three exams will be given and will constitute 75% of the course grade (including the final exam). Makeup exams will be allowed only with pre-approval of the instructor or with an acceptable, documented reason. Acceptable reasons for makeup exams include severe illness, family emergencies or other unavoidable events including dangerous weather conditions and car accidents. Exam format for makeup exams may be different than the original exam and will likely utilize a short answer format. An oral examination may also be utilized if deemed appropriate by the instructor. Exams dates and times are posted on the course calendar. Reminders will be announced in class and posted on Blackboard at least 1 week before the exam date. **PLEASE NOTE THAT EXAMS 1 AND 2 ARE SCHEDULED ON SATURDAY MORNINGS TO ALLOW YOU MORE TIME TO COMPLETE THE EXAM THEN WOULD BE POSSIBLE DURING THE NORMAL CLASS PERIOD.** You should plan your schedules appropriately to make room for the Saturday morning exam periods.

### **Plagiarism Policy:**

Plagiarism is defined as the use of another's intellectual property without correct citation of the author. Intellectual property includes all electronic, spoken or print media. Students are expected to cite all sources used in oral and written presentations. This includes the use of illustrations. Citations should be formatted according to the Columbia Guide to Style. (see: [http://www.columbia.edu/cu/cup/cgos/idx\\_basic.html](http://www.columbia.edu/cu/cup/cgos/idx_basic.html) for more information). Cases of plagiarism will be dealt with severely with the minimum penalty being a grade of 0 for the assignment in question. Cases may be referred to the Department Chair or Dean for further action.

### **Projects:**

A class project is required and constitutes 25% of your semester grade. Projects are due as indicated on the Course Calendar and must follow the guidelines provided in class by the instructor. Grading details will be provided when the project is assigned.

**Evaluation:**

Students will be evaluated through examination and/or project activities on the following areas:

- Mastery of the material.
- Application of material to research or clinical areas.
- Understanding of key concepts as demonstrated by data interpretation.
- Ability to extend knowledge to new proteins, enzymes or pathways.
- Ability to understand and discuss new material extracted from the biochemical literature.

**Grading: (Individual exam and final grades will be posted on Blackboard)**

Final grades will be calculated as follows:

Exams 1 and 2: 200 pts (100 points for each exam)

Final Exam: 100 pts (non-cumulative covering the last 1/3 of the course)

Project: 100 pts

Letter grades will be assigned as follows:

<b>A:</b> 360 – 400 points	<b>D:</b> 240 – 239 points
<b>B:</b> 320 – 359 points	<b>F:</b> Less than 230 points
<b>C:</b> 280 – 319 points	<b>I:</b> Failure to complete course requirements

**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:**

We will work with the Office of Disabilities Services (203 WHIT, 474-7043) to provide accommodations for students with disabilities. If you have a disability and require special assistance, please contact the instructor as soon as possible. Students with disabilities must provide a written statement indicating any special requirements that will be necessary as early in the semester as possible (preferably within the first week).

**Department Policy on Cheating:**

The Chemistry & Biochemistry Department Policy on Cheating is: “*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.*” The department considers performing unauthorized “dry labs” as cheating. Partnering during the lab is acceptable but lab reports must show your own calculations and ideas.

**Amending this Syllabus:**

Amendments and changes to the syllabus, including evaluation and grading mechanisms, are possible. The instructor must initiate any changes. Changes to the grading and evaluation scheme must be voted on by the entire class and approved only with unanimous vote of all students present in class on the day the issue is decided. The lecture schedule and reading assignments (daily schedule) will not require a vote and may be altered at the instructor’s discretion. Grading changes that unilaterally and equitably improve all students’ grades will not require a vote. Once approved, amendments will be distributed in writing to all students via Blackboard.