

Section 1, 3 credits, Index #44333

Meeting location and times: TBA

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Office Hours: By appointment.

Goals: This course is one of the four core graduate level biochemistry courses offered at USU. This course will focus on a detailed analysis of the principles of energy transformations in living systems. This will include a general introduction to energy requirements for living systems, thermodynamics relevant to biochemistry, core energy pathways (e.g., substrate level and oxidative phosphorylation, photosynthesis, etc.), and the diversity of fueling reactions found in living organisms. Students will gain in-depth knowledge from specialty text books, current reviews, and primary literature on these topics.

Meetings Total contact time for this course will be ~2000 min (equivalent to forty-50 min lectures). The lecture days and times will be established after the first week of classes and will be arranged as 2-3 lectures per week for 50 to 75 min each.

Text: A current high level biochemistry text book such as *Lehninger Principles of Biochemistry*, 4th edition, 2005, by Nelson and Cox is recommended as background reading. This book is available for purchase in the bookstore, but any current edition biochemistry book should work fine. Content beyond the text book level will be drawn from a variety of specialty books, current review articles, and the primary literature. Materials for the course, including literature, will be available on the course Vista webpage.

Prerequisites: A full year of undergraduate organic chemistry; a comprehensive upper division undergraduate course in biochemistry (comparable to CHEM 5700-5710 at USU), with physical chemistry recommended.

Online Info: Classroom handouts, class standings, exam keys, etc. will be available on the course Blackboard Vista webpage at bb.usu.edu. Username = banner ID; password = banner pin.

Exams: There will be three, one hour examinations worth 100 points each during the course. Missed exams will be scored as a zero. Make-up exams are possible only for excused absences by prior appointment.

Team Project: A team project, as described in the attached document, will constitute a portion of the points in the course. The written report will be worth 50 points and the team presentation will be worth 50 points.

Grading: Grading is based on the points earned on the exams and the team project components. The final letter grade will be determined by comparing the total points earned to the total points possible. Grading will be curved with consideration of the performance of the entire class and previous classes.

Three exams @ 100 points each.....	300 points
Team project report @ 50 points.....	50 points
Team project presentation @ 50 points.....	<u>50 points</u>
Total	400 points

Assessment: Assessment of the course will include a Course Evaluation (the blue forms administered by USU) at the end of the course and a mid-term Survey (administered by the Professor) seeking input on course direction and suggestions for improvement. Information from the Course Evaluation and Survey will be used to improve the course this year and in subsequent years.

Provisions: This course will adhere to the USU Academic Policies and Procedures Manual found at the web site <http://www.usu.edu/policies/>. Any student with a disability who requires accommodation must contact the instructor. The disability must be documented by the Disability Resource Center. Course materials may be requested in alternative formats.

I. Core Concepts in Bioenergetics

- Thermodynamics
- First and Second Laws
- Equilibria, Free Energy
- Electrochemistry/Electron Transfer

II. Core Metabolism

- Overview
- Glycolysis
- TCA
- Fatty Acid Metabolism
- Amino Acid Metabolism
- Oxidative Phosphorylation
- Photophosphorylation
 - Anoxygenic
 - Oxygenic

III. Metabolic Diversity

- Overview
- Chemolithotrophy
- Hydrogen Oxidation
- CO Oxidation
- Sulfur Oxidation
- Iron Oxidation
- Nitrification
- Methanotrophy and Methylotrophy
- Anaerobic Respiration
- Denitrification
- Sulfate Reduction
- Acetogenesis
- Methanogenesis
- Hydrocarbon Transformations
- Nitrogen Fixation

Chemistry 6760 Calendar, Fall 2007

Week of	Lectures	Events
8/27	1-5	Lecture begins August 27 – Time and location of meetings to be decided. Meet with Flora Shrode in Library – Information literacy
9/3	5-8	Lectures No class Monday Sept 3 rd – Labor Day Team project idea due Friday 7 th by 5 PM
9/10	8-9	Lectures Seminar by Susan Tierney Wednesday 12 th . No class Thursday 13 th -Friday 14 th .
9/17	10-15	Lectures Exam 1
9/24	16-20	Lectures
10/1	20-24	Lectures
10/8	25-29	Lectures
10/15	30-32	Lectures Exam 2 No class Friday Oct 19 th –Fall break
10/22	33-37	Lectures
10/29	37-41	Lectures Team report due Nov 2 nd by 5 PM
11/5	41-45	Lectures Exam 3
11/12		Presentations
11/19		No class –Thanksgiving Break