Chemistry 6760, Principles of Bioenergetics, Fall 2013
Utah State University
Section 1, 3 credits
Meeting location and times: TBA
Prof. Lance C. Seefeldt, W241, 797-3964, lance.seefeldt@usu.edu

Office Hours:
By appointment.

Goals:
This course is one of the core graduate level biochemistry courses offered at USU. This course will focus on an in-depth analysis of the principles of energy transformations in living systems. This will include coverage of 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
The lecture days and times will be established during the first week of classes. In scheduling the class meeting times, first priority will be to accommodate biochemistry graduate students.

Text:
A current biochemistry text book such as Lehninger Principles of Biochemistry, by Nelson and Cox is recommended as background reading. Content beyond the textbook 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 Canvas page.

Prerequisites:
A full year of undergraduate organic chemistry; a full year of undergraduate 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 Canvas page at canvas.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 appointment. Exams are open book/notes. Connection to the internet is not allowed during the exams.

Paper/Presentation Project
The paper/presentation project will have you select a current paper relevant to a list of topics. The selected paper will be agreed with the instructor and will be provided to the other students ahead of the discussion. You will make a short presentation to the class and lead a discussion over the paper. This project is worth a total of 50 points. Details of this project are outlined in a separate document.

Assignments
Five assignments worth 10 points each will be due throughout the course. Each assignment is described in a separate document.

Grading:
Grading is based on the points earned on the exams, the project, and the assignments. 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
Project @ 50 points ...................................................... 50 points
Five assignments @ 10 points each .................................... 50 points
Total ............................................................................. 400 points

Assessment:
Assessment of the course will include the University online IDEA evaluation conducted at the end of the course. Information from the evaluation will be used to improve the course.
COURSE POLICIES:
Withdrawal Policy and “I” Grade Policy
Students are required to complete all courses for which they are registered by the end of the semester. In some cases, a student may be unable to complete all of the coursework because of extenuating circumstances, but not due to poor performance or to retain financial aid. The term 'extenuating' circumstances includes:
- Incapacitating illness which prevents a student from attending classes for a minimum period of two weeks,
- A death in the immediate family,
- Financial responsibilities requiring a student to alter a work schedule to secure employment,
- Change in work schedule as required by an employer,
- Other emergencies deemed appropriate by the instructor. (http://www.usu.edu/policies/pdf/Incomplete-Grade.pdf)

Course Etiquette
Any successful learning experience requires mutual respect on the part of the student and the instructor. Neither instructor nor student should be subject to others’ behavior that is rude, disruptive, intimidating, or demeaning. The instructor has primary responsibility for and control over classroom behavior and maintenance of academic integrity.

Instructor Responsibilities
- Treat all students with courtesy and respect.
- Be open to constructive input from students in the course.
- Ensure that opportunities to participate are shared equally by all students in the class.

Student Responsibilities
- Submit or complete class work on-time and be prepared for class activities.
- Refrain from packing up belongings before class ends.
- Turn off all electronic devices that might create a disruption in class.
- Be quiet and give full respectful attention while either instructor or fellow student is speaking.
- When speaking use courteous, respectful language and keep comments and questions relevant to the topic.

Syllabus Changes
This syllabus is subject to change. I will notify the class regarding all changes.

Course Fees
There are no course fees associated with this course.

Late Work
Late work due to procrastination will not be accepted. Late work due to legitimate emergency may be accepted if the delay is for legitimate reasons. The due date and time associated with each exam and assignment are stated clearly in Canvas.

UNIVERSITY POLICIES:

Honor Pledge
As stated in The Student Code, “Each student has the right and duty to pursue his or her academic experience free of dishonesty. The Honor System is designed to reinforce the higher level of conduct expected and required of all Utah State University students.”

Upon admission to the university, you agreed to abide by this Honor Code by signing the Honor Pledge, which reads: “I pledge, on my honor, to conduct myself with the foremost level of academic integrity.” Complete academic honesty is expected in this course. Cheating on exams or plagiarism on written assignments will result in a failing grade and may result in further action according to University policy.

Academic Dishonesty
The Instructor of this course will take appropriate actions in response to Academic Dishonesty, as defined the University’s Student Code:

Acts of academic dishonesty include but are not limited to:
- Cheating using or attempting to use or providing others with any unauthorized assistance in taking quizzes, tests, examinations, or in any other academic exercise or activity, including working in a group when the instructor has designated that the quiz, test, examination, or any other academic exercise or activity be done “individually”;
  - Depending on the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments;
  - Substituting for another student, or permitting another student to substitute for oneself, in taking an examination or preparing academic work;
  - Acquiring tests or other academic material belonging to a faculty member, staff member, or another student without express permission;
  - Continuing to write after time has been called on a quiz, test, examination, or any other academic exercise or activity;
  - Submitting substantially the same work for credit in more than one class, except with prior approval of the instructor; or engaging in any form of research fraud.
- Falsification: altering or fabricating any information or citation in an academic exercise or activity.
- Plagiarism: representing, by paraphrase or direct quotation, the published or unpublished work of another person as one's own in any academic exercise or activity without full and clear acknowledgment. It also includes using materials prepared by another person or by an agency engaged in the sale of term papers or other academic materials.
Full details for USU Academic Policies and Procedures can be found at:

- Student Conduct
- Student Code
- Academic Integrity
- USU Academic Policies and Procedures

**Students with Disabilities**

Students with ADA-documented physical, sensory, emotional or medical impairments may be eligible for reasonable accommodations. Veterans may also be eligible for services. All accommodations are coordinated through the Disability Resource Center (DRC). Please contact the DRC prior to or as early in the semester as possible. Alternate formats for course content are available with advanced notice.

**Contacting the Disability Resource Center (DRC):**
- Location in Room 101 of the University Inn on-campus in Logan, Utah
- (435) 797-2444
- http://www.usu.edu/drc/

**Disability Related Resources for Current Students**

- DRC Student Handbook
- Deaf and Hard of Hearing Student Handbook
- Disability Related Scholarships
- Campus Resources
- Documentation Guidelines
- Online Resources for Students with Disabilities

**Diversity Statement**

Regardless of intent, careless or ill-informed remarks can be offensive and hurtful to others and detract from the learning climate. If you feel uncomfortable in a classroom due to offensive language or actions by an instructor or student(s) regarding ethnicity, gender, or sexual orientation, contact

- Moises Diaz, Director of Multicultural Student Services (435) 797-1733 mailto:moises.diaz@usu.edu;
- James Morales, Vice President of Student Services (435) 797-1712 james.morales@usu.edu;
- Ann Austin, Vice Provost for Faculty Development and Diversity, mailto:ann.austin@usu.edu;
- Maure Smith, GLBTA Services, mailto:maure.smith@usu.edu;
- Steven Russell, Student Advocate (435) 797-1720 mailto:s.r.aggieemail.usu.edu.

You can learn about your student rights by visiting: http://www.usu.edu/studentservices/studentcode.

**Grievance Process**

Students who feel they have been unfairly treated may file a grievance through the channels and procedures described in the Student Code: http://www.usu.edu/studentservices/pdf/StudentCode.pdf - page=3 (Article VII. Grievances, pages 27-36).
### Outline of Topics to be Covered, Chem 6760, Fall 2013

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<thead>
<tr>
<th>Lecture Module</th>
<th>Title</th>
<th>Topics</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction</td>
<td>Management of Energy in Living Systems</td>
</tr>
<tr>
<td>2</td>
<td>Bioenergetics</td>
<td>Core concepts of Thermodynamics, Laws of Thermodynamics, Equilibrium and Free Energy, Electrochemistry and Electron Transfer</td>
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<tr>
<td>3</td>
<td>Core Metabolism</td>
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<tr>
<td>3A</td>
<td>Glycolysis</td>
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<td>3B</td>
<td>TCA</td>
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<td>3C</td>
<td>Fats and Proteins</td>
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<td>3D</td>
<td>OxPhosph</td>
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<td>3E</td>
<td>Photosynthesis</td>
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<td>4</td>
<td>Metabolic Diversity</td>
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<td>4A</td>
<td>Aerobic and Anaerobic Respiration</td>
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<td>4B</td>
<td>Acetogenesis</td>
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<td>Nitrogen Metabolism</td>
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<td>8/26</td>
<td>Decide class times this week at first meeting</td>
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<td>No class Oct 9-11</td>
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<td>11/25</td>
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<td>12/2</td>
<td>Break week</td>
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