BISC 330L: Biochemistry  
4 units  
Fall 2018  
Monday, Wednesday and Friday—12-12:50 p.m.  

Room: ZHS 352  
Website: MasteringChemistry, BANCROFT330F2018  

Instructor: Christa Bancroft, Ph.D.  
Office: ZHS470  
Office Hours:  
Monday 10:45-11:45 a.m.  
Wednesday 12:00-1:00 p.m.  
Contact Info:  
Email: cbancrof@usc.edu (best choice)  
Phone number: 213-740-5553  
I will typically reply to emails within 24 hours during the workweek and 48 hours over the weekend.  

Lab Manager: Xiaojun Zhang, Ph.D.  
Office: SGM304  
Office Hours:  
Contact Info:  
Email: xiaojunz@usc.edu  
Phone number: 213-458-3224  

Teaching Assistant: TBD  
Office:  
Office Hours:  
Contact Info:  

Pearson Help: https://support.pearson.com/getsupport/s/  

Course Topic Description  

Learning Objectives  
1. Relate covalent and non covalent interactions to their importance in biological interactions and structures.  
2. Identify the amino acids and their chemical properties. Analyze how their presence in a protein changes it's overall characteristics.  
3. Identify the levels of structure in proteins and describe the stabilization of these structures.  
4. Describe the structure and mechanism of representative enzymes in biochemical pathways.  
5. Interpret plots of enzyme kinetic data both with and without inhibitors.  
6. Describe the primary catabolic and anabolic pathways pertaining to the following molecular classes (Glycolysis, Citric Acid Cycle, Electron Transport, Oxidative Phosphorylation, Pentose Phosphate,
Pathway, Light and Dark Photosynthetic Reactions, Calvin Cycle, Gluconeogenesis, Glycogenesis, 
Glycogenolysis and Beta-Oxidation):

a. Carbohydrates
b. Lipids

7. For each pathway in 6, identify the key regulatory points, the energetics of the reactions, the 
   enzymes and the chemical transformations involved. Analyze how energetic changes and hormonal 
   signals modify the reactions and change the active pathways.

8. Identify important characteristics of lipid membrane structure and compare mechanisms of 
   molecular transport across membranes.

9. Evaluate how organismal energy state and hormonal signals modify activation and inhibition of 
   different biochemical pathways.

10. Compare major cellular signaling pathways (Tyrosine kinase receptors, G-protein coupled receptors 
    and steroid receptors).

11. Interpret biochemical data tables

Prerequisite: CHEM 322A (Organic Chemistry)

Course Notes
Lectures: The lecture slides posted on the course Blackboard internet site 
(https://blackboard.usc.edu). All lectures will have an audio and written transcript section that 
should be read or listened to at home before coming to lecture that day. It is also recommended 
to read to corresponding section of the textbook in preparation for in-class problem sets. There 
will be at-home quiz questions associated with the at-home portion of the lecture. The 
remainder of the lecture slides will be presented in class.

It is important to attend all of the lectures during the course and to take good 
notes for study. Prior to attending each lecture, it is also recommended to read the 
appropriate portions of the textbook. Examinations will be based on application of material from 
lecture slides, verbal information conveyed during lecture, at-home quiz material, and in-class 
problem sets. Material from the textbook that is not presented in lecture slides or in the lecture 
presentation will not be included in examination material. All course material, information, 
announcements and grades will be posted on Blackboard until the end of the semester.

Email Communication:
To ensure privacy, only student’s USC email accounts may be used for email 
communications. Students are responsible for understanding the content of email 
messages that the instructor sends to their USC accounts. Therefore, each student must 
check their USC email regularly and make sure their account is not over quota, so new 
messages can be received.

Required Readings and Supplementary Materials
Appling, Anthony-Cahill, Mathews, Biochemistry: Concepts and Connections 
program. Can be purchased as a package in the bookstore in hardback or loose-leaf. 
Alternatively, you may buy on-line Mastering Chemistry access via the Pearson website and it will 
come with e-textbook access.

Description and Assessment of Assignments
Midterms will include multiple choice, short answer and mathematical problems that can be 
done without a calculator. Quizzes will be on material from the at-home portion of the lecture 
material and should be answered individually prior to coming to class. Points will be given both 
for participation and correctness. Problem sets will be on material from the entirety of the 
lecture. Problems will be completed in pairs or small groups. Groups might be asked at to 
present their thought process and solution to the class. Individuals within a group should all 
contribute equally to the workload. Points will be given for both participation and correctness.
Grading Breakdown
The course grade will be based upon 1280 possible points:

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Points</th>
<th>% of Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midterm 1</td>
<td>250</td>
<td>19.53</td>
</tr>
<tr>
<td>Midterm 2</td>
<td>250</td>
<td>19.53</td>
</tr>
<tr>
<td>Final Exam</td>
<td>250</td>
<td>19.53</td>
</tr>
<tr>
<td>At-home quizzes</td>
<td>80</td>
<td>6.25</td>
</tr>
<tr>
<td>In-class problem sets</td>
<td>200</td>
<td>15.63</td>
</tr>
<tr>
<td>Laboratory</td>
<td>250</td>
<td>19.53</td>
</tr>
<tr>
<td>Total</td>
<td>1280</td>
<td>100</td>
</tr>
</tbody>
</table>

Course letter grades:
Course final grades will be determined using the following scale:
A 90-100
A- 87-89.9
B+ 82-86.9
B+ 77-81.9
B- 72-76.9
C+ 67-71.9
C 62-66.9
C- 57-61.9
D+ 52-56.9
D 49-51.9
D- 46-48.9
F 45 and below

Assignment Submission Policy
Answers to quiz questions should be submitted within the two minute time-frame after a quiz question is opened in class using a smart phone, tablet or laptop computer.
Answers to group work assignments should be submitted before lecture section ends at 12:50 p.m.
If you do not have access to a smart phone, tablet or laptop computer, please see Dr. Bancroft to make accommodations to submit your assignments.

Grading Timeline
Grades for Midterm Exams will be posted within one calendar week following the exam date.

Additional Policies
Missing Midterm Exam:
In case a midterm exam must be missed for legitimate reasons, discuss the situation with the course instructor prior to the exam, if possible. If an exam is missed for an emergency or for a valid health reason (with written documentation), the scores of the other two exams will be prorated to comprise your total point score. Rules governing exams are given in more detail in your Student Contract, which is also posted on the class website: [https://blackboard.usc.edu](https://blackboard.usc.edu).

Regrades:
In the event an error is made in the grading of your exam, written submittal of a description of the error with the exam should be returned to Dr. Bancroft within a week after receiving your graded exam. After this time period, exams will not be regraded.

Lecture Absences:
Attendance at all lecture sections is expected. If you must miss class due to illness or valid USC travel, please present Dr. Bancroft with evidence of the reason for absence and you will be allowed to make-up in-class work assignments within 1 week of the missed lecture period.

Course Schedule: Statement on Academic Conduct and Support Systems

<table>
<thead>
<tr>
<th>Wk. Date</th>
<th>Lecture Topic</th>
<th>Reading</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug. 20</td>
<td>Intro to Biochemistry and the Language of Chemistry</td>
<td>Ch. 1</td>
<td></td>
</tr>
<tr>
<td>Aug. 22</td>
<td>Chemical Foundations of Life</td>
<td>Ch. 2</td>
<td>Lec 2 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Aug. 24</td>
<td>Energy in Biochemistry</td>
<td>Ch. 3</td>
<td>Lec 3 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Aug. 27</td>
<td>Energy in Biochemistry</td>
<td>Ch. 3</td>
<td>Lec 4 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Aug. 29</td>
<td>Nucleic Acids</td>
<td>Ch. 4</td>
<td>Lec 5 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Aug. 31</td>
<td>Amino Acids and Primary Structure</td>
<td>Ch. 5</td>
<td>Lec 6 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Sept. 3</td>
<td>No lecture, Labor Day</td>
<td>Ch. 6</td>
<td>Lec 7 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Sept. 5</td>
<td>Protein Structure</td>
<td>Ch. 6</td>
<td>Lec 8 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Sept. 7</td>
<td>Protein Structure and Biochemical Methods</td>
<td>Ch. 6</td>
<td>Lec 9 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Sept. 10</td>
<td>Biochemical Methods</td>
<td>Ch. 8</td>
<td>Lec 10 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Sept. 12</td>
<td>Enzymes</td>
<td>Ch. 8</td>
<td>Lec 11 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Sept. 14</td>
<td>Enzymes</td>
<td>Ch. 8</td>
<td>Lec 12 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Sept. 17</td>
<td>Enzymes</td>
<td>Ch. 8</td>
<td>Lec 13 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Sept. 19</td>
<td>Enzymes</td>
<td>Ch. 8</td>
<td>Lec 14 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Sept. 21</td>
<td>Carbohydrates</td>
<td>Ch. 9</td>
<td>Lec 14 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Sept. 24</td>
<td>Midterm 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sept. 26</td>
<td>Lipids, Membranes and Cellular Transport</td>
<td>Ch. 10</td>
<td>Lec 15 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Sept. 28</td>
<td>Lipids, Membranes and Cellular Transport</td>
<td>Ch. 10</td>
<td>Lec 15 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Oct. 1</td>
<td>Lipids, Membranes and Cellular Transport</td>
<td>Ch. 10</td>
<td>Lec 15 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Oct. 3</td>
<td>Principles of Metabolism</td>
<td>Ch. 11</td>
<td>Lec 16 quiz &amp; prob. set</td>
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<tr>
<td>Oct. 5</td>
<td>Principles of Metabolism</td>
<td>Ch. 11</td>
<td>Lec 19 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Oct. 8</td>
<td>Carbohydrate Metabolism</td>
<td>Ch. 12</td>
<td>Lec 20 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Oct. 10</td>
<td>Carbohydrate Metabolism</td>
<td>Ch. 12</td>
<td>Lec 21 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Oct. 12</td>
<td>Carbohydrate Metabolism</td>
<td>Ch. 12</td>
<td>Lec 22 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Oct. 15</td>
<td>Carbohydrate Metabolism</td>
<td>Ch. 12</td>
<td>Lec 23 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Oct. 17</td>
<td>Carbohydrate Metabolism</td>
<td>Ch. 12</td>
<td>Lec 24 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Oct. 19</td>
<td>Carbohydrate Metabolism</td>
<td>Ch. 12</td>
<td>Lec 25 quiz &amp; prob. set</td>
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<tr>
<td>Oct. 22</td>
<td>TCA Cycle</td>
<td>Ch. 13</td>
<td>Lec 25 quiz &amp; prob. set</td>
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<tr>
<td>Oct. 24</td>
<td>TCA Cycle</td>
<td>Ch. 13</td>
<td>Lec 27 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Oct. 26</td>
<td>Midterm 2</td>
<td>Ch. 13</td>
<td>Lec 27 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Oct. 28</td>
<td>Electron Transport and Ox. Phosphorylation</td>
<td>Ch. 14</td>
<td>Lec 28 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Oct. 31</td>
<td>Electron Transport and Ox. Phosphorylation</td>
<td>Ch. 14</td>
<td>Lec 29 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Nov. 2</td>
<td>Electron Transport and Ox. Phosphorylation</td>
<td>Ch. 14</td>
<td>Lec 30 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Nov. 5</td>
<td>Electron Transport and Ox. Phosphorylation</td>
<td>Ch. 14</td>
<td>Lec 31 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Nov. 7</td>
<td>Photosynthesis</td>
<td>Ch. 15</td>
<td>Lec 32 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Nov. 9</td>
<td>Photosynthesis</td>
<td>Ch. 15</td>
<td>Lec 32 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Nov. 12</td>
<td>Photosynthesis</td>
<td>Ch. 15</td>
<td>Lec 33 quiz &amp; prob. set</td>
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<tr>
<td>Nov. 14</td>
<td>Calvin Cycle</td>
<td>Ch. 15</td>
<td>Lec 35 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Nov. 16</td>
<td>Calvin Cycle</td>
<td>Ch. 15</td>
<td>Lec 35 quiz &amp; prob. set</td>
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<tr>
<td>Nov. 19</td>
<td>Lipid Metabolism</td>
<td>Ch. 16</td>
<td>Lec 37 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Nov. 21</td>
<td>No lecture, Thanksgiving</td>
<td>Ch. 16</td>
<td>Lec 38 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Nov. 23</td>
<td>No lecture, Thanksgiving</td>
<td>Ch. 16</td>
<td>Lec 38 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Nov. 26</td>
<td>Coordination of Energy Metabolism</td>
<td>Ch. 17</td>
<td>Lec 39 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Nov. 28</td>
<td>Coordination of Energy Metabolism</td>
<td>Ch. 17</td>
<td>Lec 39 quiz &amp; prob. set</td>
</tr>
<tr>
<td>Dec. 7</td>
<td>Final Exam: 11:11:50 a.m. (56 minutes)</td>
<td>Ch. 20</td>
<td>Lec 40 quiz &amp; prob. set</td>
</tr>
</tbody>
</table>

Academic Conduct:
Plagiarism - presenting someone else’s ideas as your own, either verbatim or recast in your own words - is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, “Behavior Violating University Standards” https://policy.usc.edu/scampus-part-b/. Other forms of academic dishonesty are equally unacceptable. See additional
information in SCampus and university policies on scientific misconduct, http://policy.usc.edu/scientific-misconduct.

Support Systems:
Student Counseling Services (SCS) - (213) 740-7711 - 24/7 on call
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention. https://engemannshc.usc.edu/counseling/

National Suicide Prevention Lifeline - 1-800-273-8255
Provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week. http://www.suicidepreventionlifeline.org

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-4900 - 24/7 on call
Free and confidential therapy services, workshops, and training for situations related to gender-based harm. https://engemannshc.usc.edu/rsvp/

Sexual Assault Resource Center
For more information about how to get help or help a survivor, rights, reporting options, and additional resources, visit the website: http://sarc.usc.edu/

Office of Equity and Diversity (OED)/Title IX Compliance - (213) 740-5086
Works with faculty, staff, visitors, applicants, and students around issues of protected class. https://equity.usc.edu/

Bias Assessment Response and Support
Incidents of bias, hate crimes and microaggressions need to be reported allowing for appropriate investigation and response. https://studentaffairs.usc.edu/bias-assessment-response-support/

The Office of Disability Services and Programs
Provides certification for students with disabilities and helps arrange relevant accommodations. http://dsp.usc.edu

Student Support and Advocacy - (213) 821-4710
Assists students and families in resolving complex issues adversely affecting their success as a student EX: personal, financial, and academic. https://studentaffairs.usc.edu/ssa/

Diversity at USC
Information on events, programs and training, the Diversity Task Force (including representatives for each school), chronology, participation, and various resources for students. https://diversity.usc.edu/

USC Emergency Information
Provides safety and other updates, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible, http://emergency.usc.edu

USC Department of Public Safety - 213-740-4321 (UPC) and 323-442-1000 (HSC) for 24-hour emergency assistance or to report a crime. Provides overall safety to USC community. http://dps.usc.edu