Biochemistry I (CHEM/BIOS 452)
4 Credit Hours
Prerequisites: Credit or concurrent registration in Chem 234 (Organic Chem II)
Fall 2017 (August 28, 2017 - December 8, 2017)

<table>
<thead>
<tr>
<th>Instructor name: Jung-Hyun Min</th>
<th>CRN/Course Number: 12280 and 11805</th>
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</thead>
<tbody>
<tr>
<td>Office location: 2210A SELW</td>
<td>Times and days class meets: T, R 11:00 pm – 12:15pm, plus a once a week discussion session</td>
</tr>
<tr>
<td>Office phone: 312-355-0838</td>
<td>Classroom hours &amp; location: Lecture Center Building D (D002)</td>
</tr>
<tr>
<td>E-mail address: <a href="mailto:jhmin@uic.edu">jhmin@uic.edu</a></td>
<td>Office hours: 1:45-2:45 PM T, R (drop-in); 12-1 PM F (by app’t)</td>
</tr>
</tbody>
</table>

Teaching Assistants: Teaching Assistant E-mails:
Amirrasoul Tavakoli (M12; W9; F9) atavak2@uic.edu
Charles DeLisle (M8; W1; F11) cdelis2@uic.edu

Course Description, Goals, and Objectives
In this course, students will learn about the chemistry of proteins, nucleic acids, carbohydrates and lipids. By the end of this course, students should have a good understanding about the relationship between structure and function of these polymeric macromolecules found in living systems. Techniques used to study the structure and function of these biomolecules are also discussed.

What is Biochemistry?
- Biochemistry aims to explain biological form and function in chemical terms.
- Biochemistry is nothing less than the chemistry of life.
- Study of the structure and properties of molecules in living organisms and how those molecules are made, changed, and broken down.

COURSE MATERIALS
- A nonprogrammable, scientific calculator is also required for this course.
- Download and install free molecular graphics software PyMol Educational-Use-Only version ([http://pymol.org/edu/?q=educational](http://pymol.org/edu/?q=educational)). This is used for structural visualization of molecules.

Recommended (Optional) Texts or Other Materials
Blackboard
Blackboard is used for course content and grading. To access Blackboard, go to https://uic.blackboard.com/. Log in, and select this course. Course documents such as lecture notes are found under CONTENT. Grades for tests and quizzes can be found under GRADE CENTER. Blackboard will also contain the recorded lectures via Echo360 lecture capture.

COURSE POLICIES

Calculators
IF calculators are needed for exams or quizzes, only nonprogrammable, scientific calculators will be allowed. Cell phones may not be used in place of calculators. Calculators may be prohibited for exams and quizzes at discretion of instructor.

Attendance Policy
Research indicates that students who attend class are more likely to be successful. There is no attendance requirement for this class. However, points for pop quizzes in class and in discussion cannot be received if the student is absent from class.

Policy for Missed or Late Work
Failure to submit an assignment for credit by the due date results in a grade of zero on the assignment.

Electronic Communication
The best way to reach your instructor and TA is via email. A reply will be given within 24 hours. If a reply is not received, please send a follow-up email to insure that the first one was received.

Student Courtesy Policy
Please be courteous of others in the class. Speaking on cell phones during class and discussion sections is not allowed. Personal computers or electronic notebooks can be used for taking notes and accessing notes from blackboard. No electronic communication devices of any sort are allowed during exams.

Academic Integrity Policy
As an academic community, UIC is committed to providing an environment in which research, learning, and scholarship can flourish and in which all endeavors are guided by academic and professional integrity. All members of the campus community–students, staff, faculty, and administrators–share the responsibility of insuring that these standards are upheld so that such an environment exists. Instances of academic misconduct by students will be handled pursuant to the Student Disciplinary Policy: http://dos.uic.edu/docs/Student%20Disciplinary%20Policy.pdf.

RELIGIOUS HOLIDAYS
Students who wish to observe their religious holidays shall notify the faculty member by the tenth day of the semester of the date when they will be absent unless the religious holiday is observed on or before the tenth day of the semester. In such cases, the student shall notify the faculty member at least five days in advance of the date when he/she will be absent. The faculty member shall make every reasonable effort to honor the request, not penalize the student for missing the class, and if an examination or project is due during the absence, give the student an
exam or assignment equivalent to the one completed by those students in attendance. If the student feels aggrieved, he/she may request remedy through the campus grievance procedure. [http://oae.uic.edu/UICPolicies/CampusGrievance.htm](http://oae.uic.edu/UICPolicies/CampusGrievance.htm).

**ACADEMIC DEADLINES**
[http://grad.uic.edu/cms/?pid=1000222](http://grad.uic.edu/cms/?pid=1000222)

**DISABILITY ACCOMMODATION**
The University of Illinois at Chicago is committed to maintaining a barrier-free environment so that students with disabilities can fully access programs, courses, services, and activities at UIC. Students with disabilities who require accommodations for access to and/or participation in this course are welcome, but must be registered with the Disability Resource Center (DRC). You may contact DRC at 312-413-2183 (v) or 312-413-0123 (TTY) and consult the following: [http://www.uic.edu/depts/oaa/disability_resources/faq/accommodations.html](http://www.uic.edu/depts/oaa/disability_resources/faq/accommodations.html).

**COURSE REQUIREMENTS, METHODS OF EVALUATION, & GRADING POLICIES**

**Quizzes**

- Three 30-min quizzes are scheduled during the Semester. Each quiz has a 30-point value. The quizzes are given at the beginning of a regular LECTURE CLASS. No make-up quiz will be given. The lowest quiz grade will be dropped. If one quiz is not taken, that quiz becomes the dropped quiz. A second missed quiz will be assigned a grade of **zero**. The total points possible from the quizzes is **60 points**.

- There will be pop-quizzes during classes and discussion sections throughout the semester. You must have an iClicker “remote controller” to fully participate and receive points. The total points from the pop quiz questions including those using iClickers will be worth **20 points for classes & 20 points for discussions**. There is no make-up of any kind for a missed pop quiz.

The total points from quizzes are **100 points**.

**Exams**

Three 1-hour exams are scheduled during the semester. Each hour exam has a 100 point value. The total points possible from the three 1-hour exams is **300 points**.

**Final Exam**

A final exam will be given. This exam will have a **200-point value**.

**No** make-up exams will be given. **No** exams will be dropped. Once an exam is turned in for grading, that exam will not be dropped.

If you do not take or turn in one hour exam, a grade will be assigned for the exam based on your performance on other examinations and the average class grades for the exam according to the following formula:
Missing Exam Grade = \( \frac{\text{Sum of other Hour and Final Exam Grades}}{\text{Sum of Class Averages on other Exams}} \times \text{Class Avg. on Missing Exam} \)

If you miss two hour exams or the final exam with an **excused** absence, you will be given an Incomplete.

**If you are to miss any exam/quiz due to religious holidays or need special accommodation due to a disability, please let Prof. Min know by Thursday 9/7 by email or a written letter.** In these cases, an equivalent quiz/exam will be given BEFORE the scheduled day/time. If you don’t notify by 9/7, we cannot guarantee timely accommodation.

**Final Grades**

**Final grades will be determined from the total number of points (600, see below for the break-down).** A class curve is established based on the total point average, standard deviation, and grade distribution.

**Grading Summary:** The number of total points possible is shown below.

<table>
<thead>
<tr>
<th>Graded Assignment</th>
<th>Points possible</th>
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<tbody>
<tr>
<td>Final Exam (cumulative)</td>
<td>200</td>
</tr>
<tr>
<td>In-term exams (3 @ 100 pts each)</td>
<td>300</td>
</tr>
<tr>
<td>Quizzes (3 @ 30 pts ea.), lowest dropped</td>
<td>60</td>
</tr>
<tr>
<td>In-class (iClicker) pop quizzes</td>
<td>20</td>
</tr>
<tr>
<td>Discussion (iClicker) pop quizzes</td>
<td>20</td>
</tr>
</tbody>
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Total points possible: 600
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<tr>
<th>WEEK</th>
<th>TOPIC</th>
<th>CH.</th>
<th>LEC.</th>
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<tbody>
<tr>
<td>1</td>
<td>8/29 - What is Biochemistry? Living Organisms and Molecules; Review of basic chemistry concepts for biochemistry 8/31 - Proteins: Amino Acid Structure</td>
<td>1, 2</td>
<td>OV1-2</td>
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<tr>
<td>2</td>
<td>9/5 - Proteins: Amino Acid Ionization Properties 9/7 – Proteins: Separation and Analyses Techniques</td>
<td>3</td>
<td>P1</td>
</tr>
<tr>
<td></td>
<td><strong>LAST DAY TO ADD/DROP without W grade: Fri., Sept. 8</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Q</td>
<td>9/12- Proteins: Peptide Bond and Primary Structure 9/14 - (QUIZ 1) Review (TAs)</td>
<td>4</td>
<td>P4</td>
</tr>
<tr>
<td>5 E</td>
<td>9/26 - Proteins: Quaternary Structure 9/28 - <strong>Examination I</strong></td>
<td>4</td>
<td>P7</td>
</tr>
<tr>
<td>6</td>
<td>10/3 - Proteins: Protein Folding 10/5 - Protein Structure and Function: Methods</td>
<td>4 or 5</td>
<td>P8</td>
</tr>
<tr>
<td>7</td>
<td>10/10 - Protein Structure and Function 10/12 - Protein Structure and Function</td>
<td>5</td>
<td>P10 P11</td>
</tr>
<tr>
<td>8 Q</td>
<td>10/17 - (QUIZ 2) Enzymes: Classification and Kinetics 10/19 - Enzymes: Classification and Kinetics</td>
<td>6</td>
<td>E1 E2</td>
</tr>
<tr>
<td>9</td>
<td>10/24 - Enzymes: Mechanism and regulation 10/26 - Review (TAs)</td>
<td>6</td>
<td>E3-4</td>
</tr>
<tr>
<td>10 E</td>
<td>10/31 –<strong>Examination II</strong> 11/2 - Carbohydrates and Glycobiology</td>
<td>7</td>
<td>C1</td>
</tr>
<tr>
<td></td>
<td><strong>LAST DAY TO DROP LATE with W grade: Friday, Nov. 3</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>11/7 - Nucleic Acids: Chemistry and Structure (I) 11/9 - Nucleic Acids: Chemistry and Structure (II)</td>
<td>8</td>
<td>N1 N2</td>
</tr>
<tr>
<td>12</td>
<td>11/14 - DNA-based Information Tech. (I) 11/16 - DNA-based Information Tech. (II)</td>
<td>9</td>
<td>N3 N4-5</td>
</tr>
<tr>
<td>13 Q</td>
<td>11/21 - (QUIZ 3) Lipids and Membranes 11/23 - Biological membranes and transport</td>
<td>10</td>
<td>L1 L2</td>
</tr>
<tr>
<td>14</td>
<td>11/28 - Bio-signaling &amp; Review 11/30 Thanksgiving Holiday (no class)</td>
<td>12</td>
<td>TBD</td>
</tr>
<tr>
<td>15 E</td>
<td>12/5 - Review 12/7 - <strong>Examination III</strong></td>
<td>ALL</td>
<td></td>
</tr>
<tr>
<td>16 E</td>
<td><strong>FINAL EXAMINATION – TBA (week of 12/11 – 12/15)</strong></td>
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GRIEVANCE PROCEDURES

UIC is committed to the most fundamental principles of academic freedom, equality of opportunity, and human dignity involving students and employees. Freedom from discrimination is a foundation for all decision making at UIC. Students are encouraged to study the University's “Nondiscrimination Statement”. Students are also urged to read the document “Public Formal Grievance Procedures” (http://oae.uic.edu/UICPolicies/CampusGrievance.htm). Information on these policies and procedures is available on the University web pages of the Office of Access and Equity: http://oae.uic.edu/.

CAMPUS SECURITY

As a UIC student, you've chosen to live in one of the nation's largest cities. But, as at any university, crime is a reality. At UIC, we are strongly committed to our public safety programs, and we encourage students to be proactive in learning what programs and services are available in case of an emergency. You are DISCOURAGED from staying in university buildings alone, including lab rooms, after hours and are ENCOURAGED to use the POLICE/STUDENT patrol escort if you are uncomfortable traveling anywhere on campus. You may request an escort to accompany you to your campus destination on foot by calling 312-996-2830, and between 11:00 pm and 7:00 am you can dial the Red Car service (312-996-6800) if you are alone and need to leave the building. Through Red Car, the university has established a safe evening transportation service for university employees, students, visitors, and other authorized individuals. The car travels between university facilities within the following general boundaries: Clinton Street on the east; Western Avenue on the west; Jackson Boulevard on the north; and, 16th on the south. This service is available only to individuals possessing a valid UIC i-card. The i-card is required to ensure the safety of the driver and other passengers. Consult the following for more information: http://www.uic.edu/uic/studentlife/campus/safety.shtml
Also you can subscribe your cell phone to receive text message alerts. An immediate SMS text alert will be sent in case of a serious crime in progress, a weather emergency, or other urgent situation. (http://sms.accc.uic.edu). Finally, by dialing 5-5555 from a campus phone, you can summon Police or Fire for any on-campus emergency. You may also set up the complete number, 1-312-355-5555, on speed-dial on your cell phone. For more information contact: http://www.uic.edu/uic/studentlife/campus/emergency-information.shtml

UIC RESOURCES

If you find yourself having difficulty with the course material or any other difficulties in your student life, don’t hesitate to ask for help! Come to me, or if it is about an issue beyond this class, please contact your college advisors, or get help from any number of other support services on campus. You can get a referral to the right place, or help on the spot, from concerned advisor in the Undergraduate Success Center (USC) at usc@uic.edu.

See also:
The Writing Center, located in Grant Hall 105, offers one-on-one consultation with student writers who need help developing ideas, or need advice, guidance or additional instruction on any aspects of writing in any class. Tutors are prepared to spend fifty minutes per appointment, and there is no limit to the number of tutoring sessions you can have each semester. Make an appointment and be on time! Bring the paper on which you're working, as well as any related
drafts or notes, and information about the assignment. For an appointment, call the Writing Center at (312) 413-2206, or stop by room 105 of Grant Hall. Visit the Writing Center website at www.uic.edu/depts/engl/writing for more information.

**The Science and Learning Center,** located in the Science and Engineering South Building (SES) 201B, is a meeting place for students in Biological Sciences, Chemistry, Earth and Environmental Sciences, and Physics. At the SLC, students can meet with graduate teaching assistants for tutoring in 100-level courses, arrange informal group study sessions with other students, or meet up with friends to attend one of the workshops, seminars, or other activities sponsored by the SLC during the semester. Visit the website at [http://www2.chem.uic.edu/slc/](http://www2.chem.uic.edu/slc/).

**Public Computer Labs** are available throughout campus where you may write and/or print out your work. For a list of labs and the hours they’re open, go to <www.accc.uic.edu/pclabs>. NOTE: Do not wait until the last minute to print out papers. Sometimes labs have long lines of students waiting for access.

**The Academic Center for Excellence** can help if you feel you need more individualized instruction in reading and/or writing, study skills, time management, etc. Phone: (312) 413-0031.

**Counseling Services** are available for all UIC students. You may seek free and confidential services from the Counseling Center ([http://counseling.uic.edu](http://counseling.uic.edu)). The Counseling Center is located in the Student Services Building; you may contact them at (312) 996-3490. In addition to offering counseling services, the Counseling Center also operates the InTouch Crisis Hotline from 6:00 p.m.-10:30 p.m. They offer support and referrals to callers, as well as telephone crisis interventions; please call (312) 996-5535.
Biochemistry I
Basic Mathematical Problems

1. Express in scientific notation 0.0254.

2. Indicate the number of significant figures in each of the following numbers.
   1.30
   0.206
   0.012
   36.501

3. Evaluate:
   \(81^{3/4}\)
   \(10^0\)

4. Evaluate:
   \(\log 15\)
   \(\log 0.327\)
   \(\log 1\)

5. Indicate whether the lines described by each of the following equations are straight
   or curved. If straight, compute the slope. Verify your answers by plotting on suitable
   graph paper.
   \(3y - 12x = 8\)
   \(y^2 = 16x\)

6. Solve the following equation for \(z\):
   \(z^2 + 3z + 1 = 0\)

7. Solve for \(n\): \(\log n = 0.7781\)

8. Verify: \(\ln x = 2.303 \log x\), where \(e = 2.7183\)

9. The pH = 6.6. What is the \([H^+]\)?

10. The \([H^+] = 3.4 \times 10^{-5}\) M. What is the pH?