MCB 102: Principles of Biochemistry and Molecular Biology, Summer 2004

Instructor: Barbara Bowman, Ph.D. (UCB, Biochemistry)

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or by appointment (primarily for non-science concerns)

Teaching Assistants:

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Lectures: Mon-Thurs 8:30-10:00am, 100 GPBB - B. Bowman
Discussion sessions and exams, Fridays 8:30 - 10:30am, 100 GPBB - B. Bowman
(plus additional rooms for exams, as assigned in class)

Lectures and discussions are required sessions for this four-unit course.

<table>
<thead>
<tr>
<th>TA Section Times and Locations</th>
<th>10:00am-11:00am:</th>
<th>11:00am - noon:</th>
</tr>
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<tbody>
<tr>
<td>Monday</td>
<td>179 Dwinelle - (LdlF)</td>
<td>2066 VLSB - (BB)</td>
</tr>
<tr>
<td>Tuesday</td>
<td>2038 VLSB - (LdlF)</td>
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<tr>
<td>Wednesday</td>
<td>321 Haviland - (CC)</td>
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<tr>
<td>Thursday</td>
<td>2038 VLSB - (CC)</td>
<td>2066 VLSB - (BB)</td>
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The TA sections are formally optional, but it is strongly recommended that you choose one section and attend it regularly.

Class website for currently enrolled students:

http://mcb.berkeley.edu/courses/mcb102s/102sum04.htm

Public website for the course:

http://mcb.berkeley.edu/courses/mcb102s/

This handout: **You are responsible for knowing and acting upon all the information in this course information handout.** This includes, for example, what course sessions are required or optional, and under what conditions your exams will not be graded. Having handed out this information, we assume you know it and will be responsible for acting on it appropriately.

>>> Please note that previous editions of this text will not be acceptable substitutes. <<<

Optional “Lecture Notebook”: This book contains all the figures in the text, with space for notes. Bought new, this book is not very expensive when ‘bundled’ with the text by the publisher.

Optional text/study guide package: There is an “Absolute, Ultimate” (sic) study guide that you should be able to buy ‘bundled’ with the text, which contains some suggestions for studying the material and solutions (as opposed to just answers) to the problems at the ends of the text chapters.

TA Sections:

Six discussion sections are offered, led by the teaching assistants (see first page for details). The primary purpose of these sections is to elaborate on and/or clarify material from the text or from the lectures. The classes are small, and you have the opportunity to have your questions answered in depth. Section attendance is formally optional. However, participation in sections is sometimes the key to deciding a borderline grade. It is recommended that you choose one of the six sections and attend it regularly.

Problem sets and chapter problems:

Problem sets will be distributed in lecture each week. These will be largely or completely made up of problems from my previous exams for this course, and therefore should help prepare you for the types of questions you can expect on exams. You should not expect exam questions to follow problem set questions as exact models; the problem set questions serve to alert you to the degree of understanding that will be required on exams.

The problem sets will be discussed during the review sessions (see course schedule, pp. 7-8; these are on Fridays when there is no exam, and Thursdays on weeks where there is an exam). Some of the questions may be designated to be covered in the TAs’ sections. Problem sets will not be turned in or graded. They will really be useful to you only if you complete each problem before the session at which it will be discussed.

Helpful problems from the text chapters are listed on the class website.

Exams and quizzes:

There will be four exams and two quizzes during this course. Midterms will be held during regular class hours on three Fridays: 2 July, 16 July, and 30 July. The final will be the last day of class, Friday the 13th of August; if no one in the class has a conflict, you may have three hours for the final - either from 8am to 11 or 8:30 to 11:30, to be announced at a later date.

Midterms are worth 80 points each; the final is worth 120 points. Your two best midterms will count 26.7% each towards your course grade, each quiz 3.3%, and the final 40%. Please note that no makeup midterms are given, and no exam date changes can be made for individual
students. There will be two quizzes, worth 10 points each, on the first and third Fridays of the class. Makeup quizzes may be possible under certain circumstances. Check with the instructor well in advance of the quiz date to request a makeup date, which will most often be prior to the date when the class takes the quiz. The format for the first quiz will be found on the class website.

Biochemistry is not a series of isolated subjects to be studied; in this course you will find some underlying principles and facts coming up again and again. For this reason, you must assume that exams will be cumulative. Material you learn in the first week of the course may still be necessary when answering questions on the third midterm, etc.

Second, exams in this course will be “open-cheat sheet.” We will inform you in advance of the information that will be provided with each exam (generally by alerting you to figure and table numbers from the text). I do not consider it the best use of a student’s time to memorize countless structures, partly because these are readily available in the text whenever you need them, and partly because this is the sort of material you are likely to forget anyway once the exam is over -- unless you are constantly using it (in which case you would end up memorizing it anyway without trying). What I do consider worth your time is understanding how things work at the biochemical level, so you can apply this knowledge creatively to problems you will encounter in your future careers. Exams will emphasize this type of understanding.

The material you will be expected to know and use in exams consists of 1) anything presented at lecture or ‘discussion’ sessions M-F, 2) anything in the required reading, and 3) anything in handouts given in class, including problem sets. However, emphasis will be placed on material covered in lecture and discussion.

A word of caution: Note the word ‘use’ in the previous sentence. Some exam questions will require you to make novel use of material you have learned in class. You will have to work step by step through processes you have learned, figure out how a change in one part of a system affects the other parts, etc. You will need to recognize principles learned in one system and use your reasoning ability to apply them to another. The weekly problem sets should help you to prepare for the types of questions you will be expected to answer on exams.

Students always ask how best to prepare for exams in this course. Here are some suggestions: 1) complete each reading assignment before the lecture in which it is discussed; 2) work through the problem sets as thoroughly as you can before the solutions are presented in class; 3) work with a study group, going over the lecture notes, explaining processes to each other, and articulating what the essence of each topic is, emphasizing precision and thoroughness in your explanations; and 4) bring your questions to section and/or office hours to get thorough explanations of anything that may have been unclear in the lecture or reading.

The essential component of these suggestions is that you work actively with the material. Recopying notes is sometimes useful for students, but it should constitute only a minor part of your effort. Simply recopying information does not require you to engage with the material in the way that will enable you to learn it at the level required, so is not a sufficient preparation for exams.
Grading:

Your grade will be based on your performance on the final, both quizzes, and two of the three midterms. When adding up final grades, I will simply drop out the midterm on which you obtained your lowest score. If median scores on the midterms vary widely, scores may be normalized before students’ lowest scores are determined and dropped.

If you must miss a midterm, that is the one that will be dropped from your final score. If you miss two midterms, you must either take a zero on one of them or - with a valid, documented excuse, (see ‘exam policy’) and if you have completed over half the graded material in the course - you may be allowed to take an incomplete in the course and complete it in a subsequent semester. It is strongly recommended that you not rely on dropping the first exam grade until you find out how much harder it’s going to get. Because of the hectic pace of the summer course, no makeup midterms will be given.

Course grades that fall right on the borderline between two grade groups may be decided based on the student’s participation in sections or significant improvement on exam grades over the course of the summer term. Begging, pleading, your grades in previous classes, or your need to get an A to get into med/grad/dent/vet/etc. school, will not be considered. Your performance will be.

We regret that we are unable to offer means to acquire ‘extra credit’ in order to compensate for unfavorable exam scores. Also, no substitution of problem sets, essays, etc., is possible in lieu of taking the exams.

Exam policy:

Being excused from an exam:

Valid excuses for missing an exam are incapacitating illness or injury (with a doctor’s note), or a serious illness or death in the immediate family (also requiring documentation). Career-related interviews or other unavoidable and unchangeable career-related events (with documentation provided well in advance of the exam date) will also be considered.

Because one exam will simply be dropped from the final calculation of grades, it may seem unnecessary to provide an excuse when an exam must be missed for valid reason. However, remember that if two exams are missed, the one for which no formal excuse was provided will be added into the grade as a zero, whereas if a formal excuse had been provided, the student might have been allowed to take an incomplete. I strongly recommend that you ask to be formally excused from any exam for which you do have a valid excuse.

Registration:

If your name does not appear on the class roster on the morning of the first midterm exam, you must present to us written proof before the start of the next class session, on Tuesday the 6th of July that you are enrolled in the course. Otherwise, your exam grade will not be recorded.

Regrading:

Exams will be graded with great care to ensure that partial credit is equably allotted. If, after studying the answer key, you feel strongly that you have been denied points that you deserve, please
submit your request for reconsideration to the designated Teaching Assistant, *in writing only*, within three class periods of the return of exams. State simply and clearly why you think that your answer has not been given sufficient points. Regrade requests will not be accepted until one day after the distribution of graded exams, to allow the student sufficient time to consult the answer key. Regrade requests will not be accepted more than three class sessions following distribution of the graded exams. Oral regrade requests will not be considered. Note that it may take a significant amount of time for exams to be returned after regrade requests; specifically, students probably will not have regraded exams to use in preparing for the next exam.

If you wrote *any part* of your exam in pencil or erasable ink, you may not submit a regrade request. Therefore, unless you believe your graders to be infallible, I suggest you always take exams using a permanent ink pen. Also, please write your exams in blue or black ink so that your answers can be easily separated from graders’ comments. Thank you!

4th of July Holiday:  
There will be no class on Monday the 5th of July, a University holiday.

Computer access:  
Location and hours of microcomputing facilities on campus can be found at:  
[http://facility.berkeley.edu/labs/hours.html](http://facility.berkeley.edu/labs/hours.html) We have a few copies of a printout of that web page for students who have no other computer access.

General:  
In this course, you must do a semester’s worth of work in eight weeks. The amount of material in your text is truly staggering, and it barely scratches the surface. We will cover the same amount of material as is covered when this course is taught in the spring and fall semesters, but you have only half as much time between classes to do the necessary reading and studying. It would probably be helpful if you did not need to sleep, eat, or converse with your family or friends for those eight weeks, but I realize this is not an appropriate thing to require of you... Seriously, it will be more important than ever not to get behind in the reading or problem sets. Also, this is a terrific subject, and you will enjoy the material much more if you really learn and understand it thoroughly.

I wish you the best of luck!!
Lecture Schedule for MCB102, Summer 2004

This schedule represents a close approximation to what will actually be covered in lecture on a particular date. It is subject to revision as we go along.

Week I
- 21 June Ch. 1, 2  Review of Biomolecules
- 22 June Ch. 2, 3  Acid-base chemistry; Amino acids
- 23 June Ch. 4  Protein structure and purification
- 24 June Ch. 5  Structure/function in proteins
- 25 June  Review (PS1)

   Quiz on amino acids

Week II
- 28 June Ch. 13, 6  Bioenergetics; Enzymes
- 29 June Ch. 6  Enzymatic catalysis
- 30 June Ch. 6  Regulation of catalysis
- 1 July  Review (PS2)
- 2 July  Midterm I

Week III
- 5 July Holiday
- 6 July Ch. 10, 11  Lipids, membranes
- 7 July Ch. 11, 12  Transmembrane transport & signaling
- 8 July Ch. 7  Carbohydrates and glycobiology
- 9 July  Review (PS3)

   Quiz on transmembrane transport

Week IV
- 12 July Ch. 8  Nucleotides and nucleic acids
- 13 July Ch. 9  DNA technology

   Guest lecture by Dr. Luis de la Fuente

- 14 July Ch. 24  Chromosomes
- 15 July  Review (PS4)
- 16 July  Midterm II

Week V
- 19 July Ch. 14  Glycolysis
- 20 July Ch. 14, 15  Gluconeogenesis / Pentose phosphate pathway/ Regulation of glucose metabolism
- 21 July Ch. 16  Citric acid cycle
- 22 July Ch. 17  Fatty acid catabolism
- 23 July  Review (PS5)
### Week VI
- **26 July**
  - Ch. 18
  - Amino acid catabolism
- **27 July**
  - Ch. 19
  - Electron transport
- **28 July**
  - Ch. 21
  - Lipid biosynthesis
- **29 July**
  - Review (PS6)
- **30 July**
  - **Midterm III**

### Week VII
- **2 August**
  - Ch. 25
  - DNA metabolism I - Replication
- **3 August**
  - Ch. 26
  - DNA metabolism II - Repair
  
  *Guest lecture by Mr. Christian Cunningham*
- **4 August**
  - Ch. 26, 27
  - RNA metabolism (transcription)
- **5 August**
  - Ch. 27
  - RNA; Protein metabolism (translation)
- **6 August**
  - Review (PS7)

### Week VIII
- **9 August**
  - Ch. 28
  - Protein synthesis (translation)
- **10 August**
  - Ch. 28
  - Regulation of gene expression - Prokaryotes
- **11 August**
  - Ch. 29
  - Regulation of gene expression - Eukaryotes
- **12 August**
  - Review (PS8)
- **13 August**
  - **Final exam**: 8-11am or 8:30-11:30 am if possible, otherwise 8:30-10:30 (TBA in lecture)