

# Welcome to Biology 1A, UCB, Summer 2014

**Introduction:** Hopefully you will find Biology 1A to be a fun and exciting class. It will be readily apparent that we enjoy biology and teaching! Warning - the pace will be blistering fast. You are expected to have taken the chemistry prerequisites (Chem 1A and Chem 1AL equivalent). A good understanding of chemistry is required—see the review sheet on page 5. The Bio 1A class consists of four lectures and two discussions each week. The Bio 1AL lab class consists of two lectures and two labs each week. Do not plan to take more than seven units and do not plan on working more than 20 hours per week.

**Our website is:** <http://mcb.berkeley.edu/courses/bio1a>

**Switching sections:** You can see Erol Kepkep in 2083B VLSB or send him a message requesting to switch to [bio1a-summer-enrollment@berkeley.edu](mailto:bio1a-summer-enrollment@berkeley.edu). Students enrolled in both 1A and 1AL must switch BOTH lab and discussion sections, not just one and this must be done before the first lab meeting on Monday (6/23). If you are in 1A only then you must switch prior to the first discussion on Tuesday (6/24).

**Adding:** Enroll through TeleBears. After Friday 6/20 all students wanting to add must contact Erol Kepkep (see above) and also must add to the official TeleBears enrollment waiting list. If you do not receive a response you can assume you are not enrolled.

**Attendance:** You are expected to attend ALL lectures and ALL discussions. Attendance may be taken at any or all discussions/lectures. If you are not present at discussion the first two weeks your seat may be given away. There is no webcast of the class. Papers, exams, etc. are returned in discussion. You must be present to pick them up. Lecture will be held in 245 Li Ka Shing.

**Communication:** Office hours are held in 2084 or 2088 VLSB. Email is the preferred method of communication. Email addresses are on page 4.

**Lectures and Lecturers:** Dr. Jim Baxter (6/23 – 7/24) and Dr. John Tarpey (7/29 - 8/13). Bio 1A lectures are held M. - Th. from 12:30 PM to 2:00 PM in 245 Li Ka Shing. Lectures are NOT webcast. Black lightning is authorized to take notes. For more information you can check their website. <http://blln.securesites.com/>. Dr. Baxter's contact information is [myxab2002@gmail.com](mailto:myxab2002@gmail.com). Dr. Tarpey's contact information is [John Tarpey is jtarpey@ccsf.edu](mailto:john.tarpey@ccsf.edu).

**Office hours:** See page 3. You can and should come to any or all office hours—even if your instructor does not hold them. Feel free to attend any office hour, not just those taught by your instructor.

**Discussion:** Discussion begins Tuesday 6/24 and you must attend your assigned discussion--attendance will be taken. To attempt a discussion switch email [bio1a-summer-enrollment@berkeley.edu](mailto:bio1a-summer-enrollment@berkeley.edu).

**Bio 1AL:** Most students must take both Bio 1A and Bio 1AL. Certain students (Chemical Engineering, etc.) may not be required to take Bio 1AL. Students repeating Bio 1A do not have to take the lab if they already passed Bio 1AL. **The first lab lecture will be held on Monday 6/23 and labs also begin Monday.** You should come prepared. See the Bio 1AL lab syllabus.

**bSpace:** Announcements, some handouts and exam scores will only be on bSpace. For difficulties accessing bSpace email [bio1a-summer-enrollment@berkeley.edu](mailto:bio1a-summer-enrollment@berkeley.edu).

**Changes to this syllabus and grading criteria may occur. If so, you will be informed.**

**GRADING PROCEDURE:** Letter grades will be determined from numerical scores as follows:

Midterm 1 (each lecture is worth about 15 points) Given on 7/14.	135 pt's
Midterm 2 (each lecture is worth about 15 points) Given on 7/28.	135 pt's
Final Exam (each lecture is worth about 15 points) Given on 8/14.	150 pt's
Total	420 pt's

A+ or A or A- = 100-90%	B+ or B or B- = 89-80%	C+ or C or C- = 79-70%	D+ or D or D- = 69-60%	F = 59 % or less
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Guaranteed grades are listed above. The points needed for some grades may be lowered depending upon the final distribution of students scores, i.e. we curve the class if need be (and there has always been the need). Grades will NOT be given based upon your needs, wants, desires, beliefs (I believe I should pass), admission requirements, etc. Changes to the grade distribution are NOT possible. Grade distribution is effectively set by the department of Molecular Cell Biology. Only minimal changes of 1-3% are up to the discretion of the faculty.

### **GRADING PROCEDURE:**

In the event that some examinations have been unusually difficult, the cut-offs for letter grades may be lowered (but only by a few percent and only when necessary). Historically around 50% of the class EARN A's and B's. Grades are based upon your total of lecture points.

**Lecture:** Lecture exams will be taken in class. The midterms are scheduled for **July 14<sup>th</sup>** (lectures 1-9/10 = 135 pts,) and **July 28<sup>th</sup>** (lectures 10/11 -18 = 135 pts). The last exam is scheduled for **August 14<sup>th</sup>** (lectures 19-28, 150 points). Exams cannot be taken early, nor later than the scheduled time—only during the scheduled time unless you are a DSP student.

**Exam Format:** Exams will contain multiple-choice questions and may include short answer, essay or fill in the blank questions. The short answer, essay or fill in the blank questions will not exceed 33% of the total point value for any exam.

There will be NO make-up exams. If you miss an exam due to illness, you must present a written, verifiable medical excuse. Your exam will be calculated on a pro-rated score.

### **TEXTBOOKS AND LAB MANUAL**

**Required Textbook:** *Biology*, Campbell, 9<sup>th</sup> or 10<sup>th</sup> ed. Only, by Benjamin Cummings. **Bio 1A & Bio 1B will NOT be using the Campbell book next year.**

**Course reader (lecture handouts):** Available at Replica Copy, 2140 Oxford.

**Exam Reader:** Available at Replica Copy, 2140 Oxford. It contains representative exams from previous semesters and summers. The exams in the reader should be used as a study tool.

Websites: bSpace: Announcements and some handouts will be available on bSpace along with your scores on individual assignments. Biology 1A Web Site: <http://mcb.berkeley.edu/courses/bio1a>

### **HOW TO DO BETTER IN BIOLOGY 1A**

1. Take notes during lecture and then review them after lecture.
2. Keep up with the material. It is essential that you do not fall behind.
3. Clarify topics you do not understand by
  - a. Coming to faculty office hours and asking questions. Email may work, but not as well as in person.
  - b. Coming to GSI office hours and asking questions.
  - c. Joining a study group.
  - d. Reading the book.
4. Use the exam reader, making sure you understand the reasoning behind the answers.
5. Come to the exam review sessions and ask questions. Seek help, if needed.

**Study Advice:** Read the material before lecture! At a minimum read the first page and last two pages of assigned chapters. During lecture take notes and pay attention. See the lab manual for further information on studying. The Student Learning Center may be offering study groups and drop in hours. Please refer to their website, (<http://slc.berkeley.edu>), for more information.

## Bio 1A Lectures M – Th 12:30-2:00 in 245 Li Ka Shing

## Bio 1AL Lectures M/W 10:30-12:00 in 245 Li Ka Shing

### Discussion Time and Room Lab Time & Room

Lab	Lab Time	Lab Room	Disc	Disc	Disc Room
325	M/W 3:00– 6:00 PM	2095 VLSB	105	T/Th 3 – 4 PM	160 Dwinelle
327	M/W 3:00– 6:00 PM	2097 VLSB	107	T/Th 3 – 4 PM	219 Dwinelle
415	T/Th 9:00–12:00 PM	2113 VLSB	105	T/Th 3 – 4 PM	160 Dwinelle
417	T/Th 9:00–12:00 PM	2095 VLSB	107	T/Th 3 – 4 PM	219 Dwinelle

### Exam Information

Lecture Exam 1 (7/14)	Lecture Exam 2 (7/21)	Final (8/14)
Lab Exam I (7/21)	Lab Exam II (8/11)	

### Discussion Information

Disc	Time	GSI	email	Room
105	T/Th 3:00– 4:00 PM	Lew, Helen	<a href="mailto:h_lew@yahoo.com">h_lew@yahoo.com</a>	160 Dwinelle
107	T/Th 3:00– 4:00 PM	Takata, Steve	<a href="mailto:s_takata@yahoo.com">s_takata@yahoo.com</a>	219 Dwinelle

### Section number, Instructors and email

	Meighan, Mike	<a href="mailto:mmeighan@berkeley.edu">mmeighan@berkeley.edu</a>	
Lect.	Baxter, Jim	<a href="mailto:myxab2002@gmail.com">myxab2002@gmail.com</a>	
Lect.	Tarpey, John	<a href="mailto:jtarpay@ccsf.edu">jtarpay@ccsf.edu</a>	
Staff	Erol Kepkep	<a href="mailto:bio1a-summer-enrollment@berkeley.edu">bio1a-summer-enrollment@berkeley.edu</a>	664-4759
Staff	(Lost & Found, etc.)		642-4214
	GSI for Section		UGSI for Section
325	Lew, Helen	<a href="mailto:h_lew@yahoo.com">h_lew@yahoo.com</a>	
327	Takata, Steve	<a href="mailto:s_takata@yahoo.com">s_takata@yahoo.com</a>	
415	Lew, Helen	<a href="mailto:h_lew@yahoo.com">h_lew@yahoo.com</a>	
417	Takata, Steve	<a href="mailto:s_takata@yahoo.com">s_takata@yahoo.com</a>	

Office hours are located in 2084 VLSB unless indicated otherwise.

	Monday	Tuesday	Wednesday	Thursday
9:30-10:30			Dr. Lew	
11-12		1A Lecturer		1A Lecturer
2-3	1AL Lecturer,		1AL Lecturer.	
6-7	Dr. Takata			

## Biology 1A Calendar: Summer 2014

Dr. Jim Baxter will give lectures 1-19 and Dr. John Tarpey will give lectures 20-29. Reading assignments are from Campbell, Biology, 9<sup>th</sup> or 10<sup>th</sup> edition.

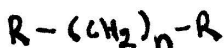
<b>Date</b>	<b>#</b>	<b>Lecture Topic</b>	<b>9<sup>th</sup> /10<sup>th</sup> ed</b>	<b>Lab, Discussion</b>
6/23	1	Introduction to living organisms	Ch. 1-4	Lab 1: Safety, Equipment
6/24	2	Biological macromolecules	Ch. 5	
6/25	3	Biological macromolecules continued. Introduction to cell structure and function	Ch. 6	Lab 2: Cells and <i>Vibrio</i> .*
6/26	4	Membrane structure & function	Ch. 7, 11	
6/30	5	Introduction to metabolism	Ch. 8, 9	Lab 3: Enzymes, Microbiology- <i>Vibrio</i> isolation.
7/1	6	Cellular respiration	Ch. 9	
7/2	7	Cellular respiration, Photosynthesis	Ch. 9 & 10	Lab 4: <i>Vibrio</i> streaking, Photosynthesis.
7/3	8	Photosynthesis	Ch. 10	
7/7	9	Cell cycles—mitosis and meiosis	Ch. 12, 13	Lab 5: Complementation I, Genetics & Mol. Biol. I, PCR.
7/8	10	Introduction to Mendelian genetics: 1	Ch. 14	
7/9	11	Mendelian genetics: 2 Chromosomal & molecular basis of inheritance	Ch. 15, 16	Lab 6: Complementation II PCR analysis, GMB. II.
7/10	12	From genes to proteins	Ch. 17, 18	
7/14		<b>LECTURE EXAM #1</b> (Lectures 1-10/11, see handout)	See handout.	Lab 7: Complementation III, Bioinformatics
7/15	13	From genes to proteins	Ch. 17	
7/16	14	Genetics of viruses and prokaryotes	Ch. 18 19, 27	Lab exam I Review
7/17	15	Genetics of prokaryotes con't Eukaryotic Gene Regulation	Ch 18, 19, 27	
7/21	15	Eukaryotic Gene Regulation: Molecular biology—strategies & applications	Ch. 19, 21, 20	<b>LAB EXAM #1</b> (Labs 1-7, see handout)
7/22	16	Molecular biology – strategies & applications	Ch. 18, 20	
7/23	17	Molecular biology – strategies & applications	Ch. 18, 20	Lab 8: Intro to Dissections, Vertebrate Anatomy
7/24	18	Review		
7/28		<b>LECTURE EXAM #2</b> (Lectures. 10/11-20, see handout)	See handout.	Lab 9: Invertebrates I
7/29	19	Introduction to animal structure and function	Ch. 40	
7/30	20	Digestion and nutrition	Ch. 41	Lab 10: Invertebrates II
7/31	21	Circulation	Ch. 42	
8/4	22	Gas exchange	Ch. 42	Lab 11: Reproduction & Dev.
8/5	23	Conservation, elimination, and osmoregulation	Ch. 44	
8/6	24	Nervous systems	Ch. 48, (48, 49)	Lab exam II Review
8/7	25	Motor and sensory systems	Ch. 49 (50)	
8/11	26	General defense and specific immunity	Ch. 43	<b>LAB EXAM #2</b> (Labs 8-11, see handout)
8/12	27	Hormones	Ch. 45	
8/13	28	Sex, reproduction, fertilization and developmen	Ch. 46, 47	
8/14		<b>LECTURE EXAM #13</b> (Lectures. 20-29, see handout)	See handout.	

## Chemistry Checklist for Biology 1A

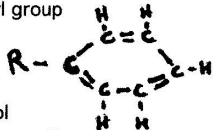
- 1) General chemistry concepts and terms you should be familiar with.
  - i) Bonding types and strengths.
  - ii) Electronegativity. Polar versus non-polar. Hydrophobicity.
  - iii) Ionization of acids and bases, pH and pKa (measure of affinity for H<sup>+</sup>), pH buffer.
  - iv) Thermodynamics.
  - v) Reaction kinetics, equilibrium, catalysts, activation energy and transition states.
  - vi) Oxidation/reduction.
  - vii) Resonance.
- 2) Forces holding atoms together.
  - i) Van Der Waals Forces/London Dispersion forces – weak, minute dipole moments.
  - ii) Hydrogen bonds - weak (1-3 Kcal/mole) due to polarity associated with unequal electron sharing.
  - iii) Covalent bonds – strong (around 100 Kcal) due to electron sharing (equal or unequal).
  - iv) Ionic bonds/Electrostatic bonds – attraction between oppositely charged ions (similar repel).

3) Functional groups of organic compounds (C can form up to 4 covalent bonds). "R" represents the remainder of the organic compound.

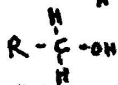
aliphatic/hydrocarbon chain



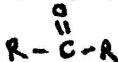
phenyl group



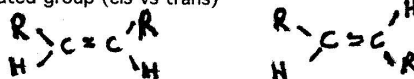
alcohol



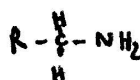
ketone (keto group)



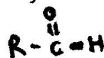
unsaturated group (cis vs trans)



amine (amino group)



aldehyde



carboxylic acid (carboxyl group)

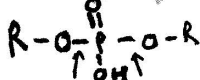


4) Linkages: covalent bonds sensitive to hydrolysis by water as shown below by arrows.

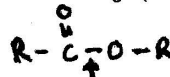
peptide linkage (between an amine and an acid)



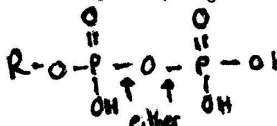
phosphodiester (between 2 alcohols and a double acid, phosphoric acid)



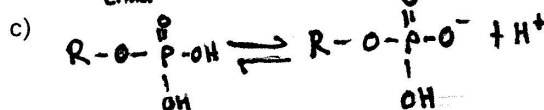
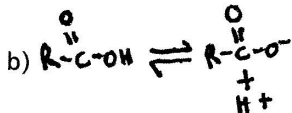
ester linkage (alcohol and acid)



acid anhydride (linkage between 2 acids)



5) Ionization of acids and bases:



6) Redox reactions:

