

Life Sciences 2.2

Cells, Tissues, and Organs, 5 credits

Course Outline Winter 2007

This course is designed for students interested in the life sciences and is part of a four-course sequence (LS1-LS4). This course has three hours of lecture per week, a three hour laboratory component alternating with an 1 ½ hour discussion section each week.

INSTRUCTORS: Dean Bok, Ph.D.
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Office Hours: Tues 11 am – noon, Wed 3 – 4 pm

LECTURE: Tues & Thurs 9:30-10:45 am Franz 1178

CLASS WEB SITE: <http://www.lsic.ucla.edu/classes/winter07/>

LAB WEB SITE: <http://lslab.lscore.ucla.edu/>

STUDY GUIDE: <http://bcs.whfreeman.com/thelifewire/>

LSCORE POLICIES: <http://www.lscore.ucla.edu/policies/>

TEACHING

ASSISTANTS:

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COURSE ADMINISTRATORS:

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REQUIRED TEXTS:

1. **Textbook** may be purchased at the ASCULA Bookstore. Sadava, Heller, Orians, Purves and Hillis, *Life, The Science of Biology*, 8th edition, 2008. Sinauer Associates, Inc.: Sunderland, Freeman and Co.: Gordonsville, VA . ISBN – 13: 978-0-7167-7671.
2. **LS 2 Laboratory Manual** may be purchased at the ASCULA Bookstore. Pfluegl, Life Sciences 2, Cells, Tissues and Organs, 6th edition, 2006-2007. Hayden-McNeil Publishing, Inc.: Plymouth, MI. ISBN #978-0-7380-2129-4.
3. A set of *Scientific American* articles can be downloaded from the UCLA library (see page 5).
4. **Chemistry CD** comes with the laboratory manual. Cooper, LS2, Cells-Organs-Tissues: The Nature & Properties of Biologically Important Molecules, edition 2.1, 2000-2005. The Regents of UCLA.

RESERVE MATERIALS:

Textbooks are on reserve in Powell Library.

EXAMS:

The exams will be given in the evening and cover material from the **Textbook**, the **Lectures**, the **Scientific American readings** and **Discussion Sections**.

Midterm I: Wednesday, Apr 18 5:00P-6:50P Haines Hall A18 & 39

Midterm II: Wednesday, May 9 5:00P-6:50P Haines Hall A18 & 39

Final Exam: Wednesday, June 13 6:30P-9:30P Location TBA

There are NO make-up exams. **If you cannot take an exam because of an emergency, you must contact the Life Sciences Core Curriculum office (LS 2305; 825-6614) before the exam with written verification of the emergency.** Exams will not be re-graded for content except in the case of a clerical error. Finals will not be returned to the students and are available for viewing at the LS-Core office (see <http://www.lscore.ucla.edu/policies.html> for details).

Grading:

Your grade will be based on total points. There are **500** possible points for the course:

Midterm Exams.....200 pts	2 @ 100pts each
Final Exam.....170 pts	Comprehensive, including 20pts from lab questions.
Discussion.....50 pts	Three worksheets on <i>Scientific American</i> articles 10pts plus 2 participation points for worksheet 1 15pts plus 4 participation points for worksheet 2 15 pts plus 4 participation points for worksheet 3
Lab Reports.....80 pts	Scientific Methods: group lab report/Proposal 15 pts Photosynthesis: quiz and group lab report 19 pts Metabolism: quiz and individual lab report 22 pts Rat dissection: in class assignment 8 pts Histology lab: in class assignment 16 pts

The Midterm exams will include both multiple-choice type questions (30 @ 2pts each) as well as short-answer questions (several worth a total of 40 pts). The Final exam will be **comprehensive** but emphasize material covered after the second midterm exam and will also include questions from the laboratory. The Final exam will be comprised of multiple-choice type questions (75 @ 2pts each, 10 lab @ 2pts each). Any score below 250 points receives a failing grade (letter grade F).

Effort:

Like most other universities, the University of California expects three hours of work each week/credit, or 15 hours each week for a five credit course. For this class, that means five hours in class and ten hours outside of class. If you cannot devote this amount of time (or more!), consider taking fewer courses, working fewer hours on your job, or dropping the course!

To understand the material and enjoy the course you should skim the textbook before lecture, attend lecture and reread the text carefully after lecture. Then, answer the conceptual questions in the Study Guide CD. If you are confused, get help right away. Do not delay!

IMPORTANT NOTICES:

Academic Integrity

Students are expected to be aware of the University policy on academic integrity in the UCLA Student Conduct Code (www.deanofstudents.ucla.edu). Please note sections on (1) plagiarism, (2) cheating and (3) unauthorized study aids. Evidence of plagiarism or cheating during examinations will be referred to the Dean of Students. **Please do not cheat.** The penalties can be very harsh. Do not believe it if you hear that “everyone does it.” You generally do not hear about the punishments because they are kept confidential. If you are caught cheating, either helping someone else or being helped, you will be reported to the Dean of Students, who will be encouraged to take strong action. If you are found guilty, action will be taken by the Dean’s office. Past examples of penalties also include loss of an entire term of credit and suspension for several terms. If you plan to apply to graduate or professional school, such a blemish on your record may be a major obstacle to admission.

Enrollment

If you are not enrolled but want to, you should keep trying URSA in case someone drops the course. If you have other enrollment concerns, please go to the Life Sciences Core Office, Life Sciences Building, room 2305, where you can contact Lily. Neither the professor nor the LS Core office has PTEs to distribute.

College Honors

Due to time constraints, we will not be offering College Honors this quarter.

Switching Sections

No laboratory switching is allowed after the second week. If you want to switch during the first two weeks you have to find a student who wants to switch sections with you. You both have to go to the LS-Core office and talk to Lily or Mark, who will switch you right there on the spot. Only under special circumstances can students go to a different section and only after arrangement in advance with your TA. Lab attendance and participation are mandatory. There also will be an item on the Blackboard discussion board for switching.

Lab Grade Transfer

Students who took LS 2 *within the past academic year*, and are repeating the course, have the option of using their prior lab grades without attending the laboratory portion of the course. This policy applies to the **laboratory portion only!!** *This policy does not transfer any points earned from the discussion section portion, lecture portion or Lab Final portion of LS 2.* For further information please go to the class web site on Blackboard.

Tardiness

Do not come late to lab or discussion section. There will be quizzes at the beginning of some sections. If you are late you will lose points. Locate the laboratories and the discussion rooms in advance, so you know where to go. For an updated location schedule see: [http://lslab.lscore.ucla.edu/](http://lslab.lscore.ucla.edu) click on ‘All Labs Spring 07’, then click on ‘Sections2’ tab. For an updated quarter schedule click on ‘Qrt2.2’ tab.

LECTURE TOPIC SCHEDULE (Subject to change):

<u>Week</u>	<u>DATE</u>	<u>LECTURE</u> (B = Bok; C = Cooper)	<u>READINGS</u>
1.	<i>Probability Lab 1.</i>		
	Apr 3	1. Chemistry and Macromolecules (B)	Ch. 2,3 & CD-ROM
	Apr 5	2. Cells: Working Units of Life 1 (B)	Ch. 4
2.	<i>Discussion I Article 1: 'Birth of Complex Cells'</i>		
	Apr 10	3. Cells: Working Units of Life 2 (B)	Ch. 4
	Apr 12	4. The Dynamic Cell Membrane (B)	Ch. 5
3.	<i>Photosynthesis Lab 2.</i>		
	Apr 17	5. Energy Enzymes & Metabolism (B)	Ch. 6
	Apr 18	Midterm I, 5-6:50 pm (Lectures 1 – 5, Article 1)	
	Apr 19	6. Glycolysis & Cellular Respiration (B)	Ch. 7
4.	<i>Discussion II Review of Midterm I</i>		
	Apr 24	7. Photosynthesis (B)	Ch. 8
	Apr 26	8. Animal Development (B)	Ch. 43
5.	<i>Metabolism Lab 3.</i>		
	May 1	9. Animal Hormones (B)	Ch. 41
	May 3	10. Animal Reproduction (B)	Ch. 42
6.	<i>Discussion III Article 2: 'Cell Communication'</i>		
	May 8	11. Cell Signaling & Communication (C)	Ch. 15
	May 9	Midterm II, 5-6:30 pm (Lectures 7 – 11, Article 2)	
	May 10	12. Homeostasis & Temperature Regulation (C)	Ch. 40
7.	<i>Rat Dissection Lab 4.</i>		
	May 15	13. Cell Specialization –Neurons; Action Potentials & Synaptic Transmission 1 (C)	Ch. 44
	May 17	14. Cell Specialization –Neurons; Action Potentials & Synaptic Transmission 2 (C)	Ch. 44
8.	<i>Histology Lab, Lab 5.</i>		
	May 22	15. Organization of the Nervous System (C)	Ch. 46
	May 24	16. Physiology of Muscle Contraction (C)	Ch. 47
9.	<i>Discussion IV Article 3: 'The Addicted Brain'</i>		
	May 29	17. Circulatory Systems (C)	Ch. 49
	May 31	18. Gas Exchange & the Respiratory System (C)	Ch. 48
10.	<i>Discussion V: Review for Final Exam</i>		
	June 5	18. Nutrition, Digestion & Absorption (C)	Ch. 50
	June 7	19. Salt Balance & Excretion (C)	Ch. 51
Final	June 13	Final, 6:30-9:30pm	(Covers all Materials)

DISCUSSION SECTION:

The sections meet weeks 2, 4, 6, 9 and 10 in the **discussion rooms** and will focus on the discussion of three *Scientific American* articles and lecture material. However, sections during week 10 will be focus on a review for the final. There will be 50 points possible for discussion sections (three worksheets worth 15 points and 5 points awarded for overall participation, for a total of 50 points). There will be no make-ups. You are required to turn in the completed worksheet for the article when it is due (see below), or you will lose points (**2 point deduction PER DAY for every day beyond the due date**). Please go online (see below) to get these articles and print them out at the start of the quarter! You will find a worksheet on the assigned article posted on Blackboard. You will then be expected to fully participate in a subsequent class discussion of the article and the lecture materials.

Articles for Discussion:

- 1.) **“The Birth of Complex Cells”**,
Christian de Duve, *Scientific American*, April 1996, Vol. 274 Issue 4, pp. 50-57
- 2.) **“Cell Communication: The Inside Story”**,
John D. Scott and Tony Pawson, *Scientific American*, June 2000, pp. 72-79
- 3.) **“The Addicted Brain”**,
Eric J. Nestler & Robert Cl Malemka, *Scientific American*, March 2004, pp. 78-85

Instructions for accessing the Scientific American articles online:

These instructions will work with on-campus computers or with a Bruin OnLine (BOL) Proxy Server setup on off-campus computers. For detailed instructions on how to set up the BOL Proxy Server, please go to <http://www.bol.ucla.edu/>, there is a link on how to setup Proxy Servers.

1. Go to the UCLA Online Library Catalog <http://www2.library.ucla.edu/>.
2. Move mouse over **‘Search and Find’**.
3. Move mouse down drop-down list to **E-resources**.
4. Move mouse down second drop-down list to **‘E-journals’** and click mouse.
5. This will lead you to a new page:
On this page in the **‘Search for e-journal titles’** box, type **“Scientific American.”**
6. Leave default radio-button at **‘keywords in title’** and click **‘Search’** button.
7. The right Panel will show several links.
8. Choose **‘v.268 (1993)- Scientific American Archive, Restricted to UC campuses’**
9. This will lead to yet another page:
On this page in the **‘Find’** box, type title of desired article and click **‘Search’** button.

LABORATORY:

There will be five meetings in the laboratory, which will be held in the teaching laboratories located on the second floor of Young Hall South. The laboratory sections will consist of the following laboratory exercises:

1. **“Probability Lab”** Exploring scientific methodologies, Memory Interference Test
2. **“Photosynthesis”** Spectrophotometry and chromatography of photosynthetic organisms
3. **“Metabolism”** Respiration in gold fish
4. **“Rat Dissection”** Focusing on structure and function of a dozen major organ systems
5. **“Histology”** Microscopy and characterization of various tissues and cells

You are required to turn in the completed lab-report when it is due as follows below or you will lose points (**2 point deduction PER DAY for every day beyond the due date**).

<u>Lab Meetings:</u>		<u>Laboratory Topic</u>	<u>Due Date</u>	<u>Location</u>
April 3-6	Week 1	Probability Lab	Week 3	Lab room
April 17-20	Week 3	Photosynthesis	Lab Week 5	Lab room
May 1-4	Week 5	Metabolism Lab	Week 7	Lab room
May 15-18	Week 7	Rat Dissection	in lab assignment	Lab room
May 22-25	Week 8	Histology Lab	in lab assignment	Lab room

<u>Discussion Meetings:</u>		<u>Discussion Topic</u>	<u>Due Date</u>	<u>Location</u>
April 10-13	Week 2	Birth of Cells	Week 2	Discussion Room
April 24-27	Week 4	Review of Midterm I	-	Discussion Room
May 8-11	Week 6	Cell Communication	Week 6	Discussion Room
May 29-Jun1	Week 9	Addicted Brain	Week 9	Discussion Room
Jun 5-8	Week 10	Review	-	Discussion Room

Location Schedule:

There will be fourteen sections (A-O). Sections will be meeting at different times in the discussion rooms (Math Sciences, Slichter Hall) and the lab rooms (in Young Hall South).

<u>Section</u>	<u>Day</u>	<u>Time</u>	<u>Discussion room</u>	<u>Lab room</u>
2A	T	12:00 - 2:50	MS3915G	YH2336
2B	T	3:00 - 5:50	MS3915G	YH2336
2C	T	12:00 - 2:50	MS3915H	YH2370
2D	T	3:00 - 5:50	MS3915H	YH2370
2E	W	8:00 - 10:50	MS3915G	YH2336
2F	W	9:00 - 11:50	SL2834	YH2379
2G	W	12:00 - 2:50	SL2834	YH2379
2H	R	11:00 - 1:50	MS3915G	YH2336
2I	R	2:00 - 4:50	MS3915G	YH2336
2J	R	11:00 - 1:50	MS3915H	YH2370
2K	R	2:00 - 4:50	MS3915H	YH2370
2L	R	3:00 - 5:50	SL2834	YH2379
2M	F	9:00 - 11:50	MS3915G	YH2336

UNDERGRADUATE RESEARCH INITIATIVE (UCLA IRB #G06-09-079-01):

The Undergraduate Research Initiative at UCLA (URI), aims at bringing research to undergraduates, such as you, students in LS2. In the URI, students learn about cutting-edge research in various fields of sciences by experiencing it. The URI is not a course; it is a collaboration. Students in different undergraduate courses – from general education science to upper division life sciences – participate and learn while building a major research accomplishment.

The specific aims of this current project are two-fold: The first aim is to provide undergraduate students with a database through which they can understand research design. The current project proposes to assess cognitive functioning of undergraduate students through sophisticated computerized measures developed by a neuropsychologist, the Memory Interference Test (MIT). This will allow students to experience how real research studies are conducted and understand the different phases of research design. Students will not only be able to participate as subjects in the research but will also have the opportunity to generate hypotheses and to analyze their hypotheses through the aggregated database. Advanced students will have the opportunity to participate in groups geared toward publishing the research in scientific journals.

The URI Project is a quarter long assignment and has six components. **1.)** Memory Interference Test, which will be introduced during Lab 1 (Week 1). Students who choose to participate will conduct the test, which will take about 15 minutes. This will generate the database upon which the hypothesis can be tested. **2.)** The writing of a 1-page individual lab report due in Week 3. **3.)** Individual research proposals due Week 8. **4.)** Test the individual hypothesis against the aggregated database from Lab 1. **5.)** Turn in individual lab report in Week 10. Below is a summary of the URI project, as it is integrated into the quarter schedule. There are a total of 15 points assigned to the URI Project.

Week	Lab	Activity	Assignment	Points	Due
1	URI 1,2	Memory Interference Test	Individual Lab Report	5	Week 3
3	2	Photosynthesis Quiz	Group lab report	15 4	Week 5 In Lab
5	3	Metabolism Quiz	Individual lab report	18 4	Week 7 In Lab
6	URI 3	Discussion	Individual Research Proposal	4	Week 8
7	4	Rat Dissection	In Lab Assignment	8	In Lab
8	5 URI 4,5	Histology Test Hypothesis	In Lab Assignment Individual Lab Report	16 6	In Lab Week 10
			Lab questions for final	20	
Total				100	

Laboratories Schedule

LS2-2	Spring 2007	Drs. Cooper/Bok
Lecture TR 9:30-10:45am Franz 1178		
Laboratory Sections	TA-Meetings	Discussion Sections

Week		Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	Lab 1 Scientific Method	1-Apr	2-Apr	3-Apr	4-Apr	5-Apr	6-Apr	7-Apr
2	Discussion 1	8-Apr	9-Apr	10-Apr	11-Apr	12-Apr	13-Apr	14-Apr
3	Lab 2 Photosynthesis	15-Apr	16-Apr	17-Apr	18-Apr Midterm 1 5-6:50pm	19-Apr	20-Apr	21-Apr
4	Discussion 2	22-Apr	23-Apr	24-Apr	25-Apr	26-Apr	27-Apr	28-Apr
5	Lab 3 Metabolism	29-Apr	30-Apr	1-May	2-May	3-May	4-May	5-May
6	Discussion 3	6-May	7-May	8-May	9-May Midterm 2 5-6:50pm	10-May	11-May	12-May
7	Lab 4 Rat Dissection	13-May	14-May	15-May	16-May	17-May	18-May	19-May
8	Lab 5 Histology	20-May	21-May	22-May	23-May	24-May	25-May	26-May
9	Discussion 4	27-May	28-May Holiday	29-May	30-May	31-May	1-Jun	2-Jun
10	Discussion 5	3-Jun	4-Jun	5-Jun	6-Jun	7-Jun	8-Jun	9-Jun
Finals	No Lab	10-Jun	11-Jun	12-Jun	13-Jun Final Exam 6:30-9:30	14-Jun	15-Jun	16-Jun