

University of Pittsburgh

Department of Biological Sciences

Bio. Sci. 0715: Foundations of Biology (UHC) Fall Term, 2002

GENERAL INFORMATION

Instructor: Chuck Walsh

Office: 213A Clapp Hall

Phone: 412-624-5025

email: cwalsh@pitt.edu

Lectures: Tuesday & Thursday 9:30 - 10:50 A220 Langley Hall

Recitation: Thursday 11:00 - 11:50 A220 Langley Hall

Reading Material:

Text: "Biology" (6th ed.) by Campbell & Reece: Benjamin Cummings, © 2002.

Other: Several review articles, principally from Scientific American.

The text and two copies of each article are on reserve in Langley Library (2nd floor, Langley Hall).

Recitation questions and copies of this schedule as well as other course related material can be down-loaded from my web site at www.pitt.edu/~cwalsh/.

LECTURE SCHEDULE

Day	Date	Topic	Text Reading
T	8/27	1. Introduction and History of Biology	Chapter 1
H	8/29	2. Atoms, Water, Carbon, Molec.Diversity	Chapters 2, 3, 4
T	9/3	3. Macromolecular Structure & Function I	Chapter 5
H	9/5	4. Macromolecular Structure & Function II	Chapter 5
T	9/10	5. Introduction to Metabolism	Chapter 6
H	9/12	6. The Cell I	Chapter 7
T	9/17	7. The Cell II	Chapter 7
H	9/19	8. Membrane Structure & Function	Chapter 8
T	9/24	9. Respiration	Chapter 9
H	9/26	10. Photosynthesis	Chapter 10
T	10/1	FIRST HOUR EXAM	Chapters 1-9
H	10/3	11. Cell Communication	Chapter 11
T	10/8	12. The Cell Cycle	Chapter 12
H	10/10	13. Plant Diversity I & II	Chapters 29 & 30
T	10/15	14. Plant Structure, Growth & Transport	Chapters 35 & 36
H	10/17	15. Plant Nutrition, Reproduction & Development	Chapters 37 & 38
T	10/22	16. Plant Control Systems	Chapter 39

H	10/24	17. Intro. to Animal Structure & Function	Chapter 40
T	10/29	18. Animal Nutrition & Circulation I	Chapters 41 & 42
H	10/31	19. Circulation II and Gas Exchange	Chapter 42
T	11/5	SECOND HOUR EXAM	Chapters 10-12, 29-30,35-41
H	11/7	20. The Body's Defenses	Chapter 43
T	11/12	21. Controlling the Internal Environment	Chapter 44
H	11/14	22. Controlling the Internal Environment	Chapter 45
T	11/19	23. Nervous Systems I	Chapter 48
H	11/21	24. Nervous Systems II	Chapter 48
T	11/26	25. Sensory & Motor Mechanisms I	Chapter 49
T	11/26	TERM PAPER DUE	
H	11/28	NO CLASS (Thanksgiving)	
T	12/3	26. Sensory & Motor Mechanisms II	Chapter 49
H	12/5	27. Sensory & Motor Mechanisms III	Chapter 49
W	12/12	THIRD HOUR EXAM & FINAL EXAM 12:00 TO 1:50 PM, ROOM A220 LANGELY HALL	Chapters 1-12, 29-30, 35-45, 48-49.

ABOUT THE COURSE

Your suggestions for improving the course are welcome at any time. The intent is to provide, for a selected group of highly capable students, a more intensive and more rigorous coverage of the same material covered in the non-honors sections of Bio. Sci.

0150. (Needless to say, this course will suffice for any subsequent course that has Bio. Sci. 0150 as a prerequisite.) The principal differences from the non-honors version will be:

- 1) That somewhat more reading, drawn from material other than the text, will be required,
- 2) That the factual content of the lectures will be presented somewhat more rapidly, to allow time for discussing how the factual content has been arrived at through experiments,
- 3) That the recitation sessions, which will be supervised by the instructor, are meant to serve not just to clarify material already covered, but also to provide further examples and to extend understanding to deeper levels, and
- 4) That a short paper will be required.

We would like you to come away from this course not just with a firm understanding of biology at the organismal level, but also with two other things. First, we hope you will gain a sense of the fact that living organisms, despite their incredible diversity, nonetheless have an underlying unity that arises from evolutionary history and from the fact that all living things obey the laws of physics and chemistry; we therefore hope that you will appreciate why an understanding of biology depends on a reasonable familiarity with evolution and some of these physical and chemical laws. Second, we hope you will get a glimpse of what it is like to be a biologist, including especially some of the joy that comes of designing and executing clean experiments that provide new understanding.

GRADING

An honors course presents some grading problems, especially if, as in this case, it is offered as an alternative to a regular course. Our response to these problems is basically this: that you will probably have to work somewhat harder in this course to achieve the same grade you could get more easily in the non-honors version. If this means that you would rather take that version to maximize your possible grade, then so be it; you are free to do so. Note, however, that UHC courses are specifically designated as such on transcripts, and that this designation cannot help but carry some weight when your transcript is eventually evaluated by prospective employers or postgraduate school admission committees.

Grading will be on a curve, as in the non-honors version, but we hope and expect that the average grade will be somewhat higher, about a "B". Note, however, that this is far from a free ride; low grades will be given if they are deserved. It's just that we hope that few (ideally none) of you will deserve them.

Grades will be determined as follows:

First Hour Exam 20%

Second Hour Exam 20%

Third Hour Exam 20%

Final Exam 20%

Paper 10%

Recitation Sessions 10%

For the three Hour Exams and the Final Exam, half of the exam will consist of true-false or multiple-choice questions, and the other half will consist of brief essay questions (like those in recitation session). For the essay questions, full credit will require a response which is intelligible, grammatical, and legible (and, of course, correct!). The Final Exam will be cumulative.

The portion of your grade derived from the recitation sessions will come mostly from the brief written answers you provide at each session, but a minor part will depend on your verbal participation in the problem-solving sessions.

PAPER

The paper, which is due on Tuesday, November 26, is to be:

- typewritten
- double-spaced
- 5-10 pages (about 1500-3000 words)
- on a single side of the page
- in a font no smaller than 10 point (12 is preferred).

It must be on a topic closely related to the content of the course. The topic is otherwise up to you, subject to the following constraints:

1) If the topic is one already covered in lectures and/or reading material, the paper must cover it in significantly greater depth, and must make use of other source materials (for example, other Scientific American articles, or other articles from research journals, or, less desirably, other textbooks);

2) If the topic is not directly covered in the course, then the paper should cover it at about the same level as the course would, were it included.

We recommend that you choose a topic you're interested in, but that you don't bite off more than you can chew. For those who are uncertain about their interests, I will provide a list of Scientific American articles. Looking through this collection might

help you find something of interest. In order to make sure that your paper topic is appropriate you will be asked to hand in a topic soon after the first exam. In grading the papers we will look first for clarity of argument and comprehensiveness of coverage, then for proper citation of source materials and proper use of the language.

References: You must cite the source for all facts and ideas that are not your own. This should be done in the text as they occur. You may use the number system, common in scientific papers, in which each reference is given a number in the reference list, usually alphabetical by first author, and then the number is inserted in the text as appropriate. You may also use any of the other standard systems found in scientific papers.

Example of proper citations:

Many reports suggest that the sky is blue (3). However a minority of students find that it is gray or some variation of white (2). In the present paper we will examine the scientific evidence that bears on this important question. Recent experimental approaches have been reviewed by a number of authors (see for example 1, 4-6).

References cited:

1. Black, B.M. and G.J. Blue. 1997. The sky is not blue. J. of Irreproducible Results 12: 34-56.
2. Blue, G.J. and C.D. White. 1947. Grey skies are the rule. J. of the Grump Society 14: 1024-2057.
3. Rogers, M.R. et al. 1957. Blue skies. Disney J. of Science 22: 12-56.

If in doubt, please see me for additional examples.

WWW: While you may find the web useful in locating information, you should not cite web sites as the source of facts or ideas. Web sites are frequently transient and usually not subjected to any form of peer review. They might not be available to someone who wanted to follow up on your citations. You might include a separate list of web cites that provided useful information but the primary references must be to the published and reviewed literature. Note that many published journals are available on line, these are not considered web sites you would cite the journal.

Please note: This paper must be your individual work. Use of another persons work, whether an individual or a commercial organization, is specifically forbidden. Any student who turns in a term paper prepared by someone else as his/her own work will receive a grade of zero for the paper. Such a student will also be turned over to the University board that deals with infractions of academic integrity for appropriate action.

RECITATION SESSIONS

Attendance at the recitation sessions is required. The nature of the sessions will alternate from one week to the next. For one set of sessions you will be given in advance a set of five questions about material currently being covered in lecture; these questions require brief written answers. During the first 5 minutes of the recitation session you will be asked to answer one of these questions in writing. Subsequently we will discuss the correct answer to this question and the four others, plus any questions which you may want to raise from lectures or reading. Then the last half of the session will involve an attempt to solve a problem, using the facts and ideas currently being covered. For the second set of sessions you will be given, in advance, a set of questions about a particular Scientific American article; these questions will also require brief written answers. You should read the article in advance. During the first 5 minutes of the recitation session you will be asked to write a brief answer to one of the questions. Subsequently we will discuss the questions and their answers, followed again by a half-hour problem-solving session, this time using the facts and ideas in the reading.

STUDENTS WITH DISABILITIES

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and the Office of Disability Resources and Services, 216 William Pitt Union, (412) 648-7890 (412), 383-7355 (TTY) as early as possible in the term. DRS will verify your disability and determine reasonable accommodations for this course.

Day	Date	Material
H	8/29	Introduction to experimental design
H	9/5	Text and Lecture Question Set No. 1
H	9/12	Scientific American Article No. 1
H	9/19	Text and Lecture Question Set No. 2
H	9/26	Scientific American Article No. 2
H	10/3	Text and Lecture Question Set No. 3
H	10/10	Scientific American Article No. 3
H	10/17	Text and Lecture Question Set No. 4
H	10/24	Scientific American Article No. 4
H	10/31	Text and Lecture Question Set No. 5
H	11/7	Scientific American Article No. 5
H	11/14	Text and Lecture Question Set No. 6
H	11/21	Scientific American Article No. 6
H	11/28	THANKSGIVING RECESS
H	12/5	No recitation

The Text and Lecture Question Sets and the Scientific American Article Question Sets are available on the web site: www.pitt.edu/~cwalsh/.

The Scientific American articles, 2 copies of each of which are on reserve in Langley Library, are as follows:

No. 1 "The Protein Folding Problem", Richards, Jan, 1991, pp.54-63

No. 2 "The Cellular Chamber of Doom", Goldberg, Elledge & Harper, Jan., 2001, pp. 68-73.

No. 3 "How Plants Make Oxygen", Govindjee & Coleman, Feb, 1990, pp.50-58"

No. 4 "The Tick-Tock of the Biological Clock", Young, March, 2000, pp. 64-71.

No. 5 "Cystic Fibrosis", Welsh & Smith, Dec., 1995, pp. 52-59.

No. 6 "New Nerve Cells for the Adult Brain", Kempermann & Gage, May, 1999, pp. 48-53.