University of Pittsburgh

Department of Biological Sciences

Bio. Sci. 0716: Foundations of Biology (UHC) Spring Term, 2003

GENERAL INFORMATION

Instructor:	Chuck Walsh	624-5025	213A Clapp Hall
Lectures:	Tuesday & Thursday	9:30 - 10:50	A220 Langley Hall
Recitations:	Thursday	11:00 - 11:50	A220 Langley Hall

email: cwalsh@pitt.edu

Reading Material:

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

Other: Several review articles, principally from Scientific American.

Additional information is available on the course web site:

www.pitt.edu/~cwalsh

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

LECTURE SCHEDULE

Day	Date	Topic	Text Reading
T	1-7	1. The Origins of Evolution & Genetics	Chapters 22 & 14
H	1-9	2. Mendel and the Origins of Genetics II	Chapter 14
T	1-14	3. Meiosis & The Chromosomal Basis of Inheritance I	Chapters 13 & 15
H	1-16	4. The Chromosomal Basis of Inheritance II	Chapter 15
T	1-21	5. How Populations Evolve	Chapter 23
H	1-23	6. The Origin of Species I	Chapter 24
T	1-28	7. The Origin of Species II & Tracing Phylogeny I	Chapters 24 & 25

H	1-30	8. Tracing Phylogeny II	Chapter 25

Day	Date	Topic	Text Reading
T	2-4	9. The Origin of Life & Prokaryotes I	Chapters 26 &27
H	2-6	10. Prokaryotes II, Protists, & Eukaryotic Origins	Chapters 27 & 28
T	2-11	**FIRST HOUR EXAM**	Chapters 13-15, 22-28
H	2-13	11. Fungi & Invertebrates I	Chapters 31& 32
T	2-18	12. Invertebrates II and Animal Diversity	Chapters 32& 33
H	2-20	13. The Vertebrate Genealogy	Chapter 34
T	2-25	14. Introduction to Ecology & Behavior	Chapter 50& 51
H	2-27	15. Population Ecology & Communities I	Chapters 52& 53
T	3-4	No Class - Spring Recess	
H	3-6	No Class - Spring Recess	
T	3-11	16. Communities II & Ecosystems	Chapters 53& 54
H	3-13	17. Conservation Biology	Chapter 55
T	3-18	**SECOND HOUR EXAM**	Chapters 27-28, 31-34, 50-55
H	3-20	18. The Molecular Basis of Inheritance I	Chapter 16
T	3-25	19. The Molecular Basis of Inheritance II	Chapter 16
H	3-27	20. From Gene to Protein I	Chapter 17
T	4-1	21. From Gene to Protein II	Chapter 17
H	4-3	22. Viral & Bacterial Genetics	Chapter 18
T	4-8	23. Eukaryotic Gene Expression I	Chapter 19

H	4-10	24. DNA Technology	Chapter 20
T	4-15	25. Development I	Chapter 21
T	4-15	**TERM PAPER DUE in class at 9:30 A.M.**	
H	4-18	26. Development II	Chapter 47
F	4-25	**THIRD HOUR EXAM & FINAL EXAM 4:00 TO 5:50 PM, ROOM A220 Langley HALL**	Chapters 13-28, 31-34, 47,50-55

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. 0160. (Needless to say, this course will suffice for any subsequent course that has Bio. Sci. 0160 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, 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. 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% : Note that the third hour exam and final are

given together during finals week.

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 but will emphasize material from the first two-thirds of the course.

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.

TERM PAPER

The paper, which is **due on Tuesday, April 15,** is to be equivalent in length to 5-10

pages of double-spaced typewritten text (about 1500-3000 words). 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.

It is recommended 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, please discuss your choice of topic ahead of time with the instructor. 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. Gray 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. (The obvious exceptions to this are were you use the web to access papers in published journals.) They would not be available to someone who wanted to follow up on your citations. You might include a separate list of web sites that provided useful information but the primary references must be to the published and reviewed literature.

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 session 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.

RECITATION SESSION SCHEDULE

Day	Date	Material
H	1/9	Text and Lecture Question Set No. 1
H	1/16	Scientific American Article No. 1
H	1/23	Text and Lecture Question Set No. 2
H	1/30	Scientific American Article No. 2
H	2/6	Text and Lecture Question Set No. 3
H	2/13	Scientific American Article No. 3
H	2/20	Text and Lecture Question Set No. 4
H	2/27	Scientific American Article No. 4
H	3/6	No Recitation - Spring Recess
H	3/13	Text and Lecture Question Set No. 5
H	3/20	Scientific American Article No. 5
H	3/27	Text and Lecture Question Set No. 6
H	4/3	Scientific American Article No. 6
H	4/10	Recombinant DNA problem
H	4/17	No Recitation

The Text and Lecture Question Sets and the Scientific American Article Question Sets are available on the course web site:

www.pitt.edu/~cwalsh/BioSci_716/recitations.html.

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

No.	Title	Author	Date	pages
1	"Parental Imprinting of Genes"	Sapienza	Oct, 1990	52-60
2	"What Caused the Mass Extinction" (Note: Three short articles)	Alvarez, Asaro & Courtillot	Oct, 1990	76-92
3	"The Evolution of Life on the Earth" & "God's Utility Function"	Gould, Dawkins	Oct, 1994 Nov,1995	84-91 80-85
4	"Singing Caterpillars, Ants, and Symbiosis"	DeVries	Oct, 1992	76-82
5	"The Bioinfomatics Gold Rush & Beyond the Human Genome"	Brown & Ezzell	July,2000	58-69
6	"How the Body Tells Left from Right "	Belmonte	Jun,1999	46-51