Biology 206 – Introduction to Organismal Biology

Winter 2003 – David E. Schneider and Jeff Young

Lecture:	BI 355, MTWF, 10am
Lab:	BI 355, R 1-4
Office Hours:	Schneider – (BI 311): MTWF 12-1; R10-11
	Young – (BI 412): MWF 2-3 and by appointment
Phone/email:	Schneider – 650-3635, schneider@biol.wwu.edu
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Course web pages:	http://www.biol.wwu.edu/206
	http://www.biol.wwu.edu/young/206y.html
Graduate TA:	Jeannie Gilbert BI 149 (650-7462)
Undergrad. TA:	Christina Pince

Required Texts:

1. Campbell, N.A. and J.B. Reese. 2002. Biology, 6th edition
2. Biology 206 – Organismal Biology Laboratory Manual
3. Rust,T.G. 1983. A Guide to Biology Lab, 3rd edition
4. Knisely, K. 2002. A Student Handbook for Writing in Biology

Course Objectives:

Biol 206 - Introduction to Organismal Biology is an introduction to the anatomical structures and functions of the magnificent diversity of life found on this planet. The course will focus mostly upon the flowering plants and the multicellular animals, but some reference will be made to lower plants and protists. The course is organized around the central problems faced by all organisms: nutrition, respiration, water balance, excretion, monitoring internal and external environments, movement, reproduction, and development. In this course, we will explore the ways in which different organisms have dealt with these problems, and where possible, examine major evolutionary trends in the solutions to these problems. A major objective of this course is to provide a fuller understanding of how diverse organisms coordinate the functions of their body and how they deal with changes in their internal and external environments.

Evaluation:

Grades will be assigned on the basis of your performance on two midterm exams (each one hour long, in class), the final exam, and your laboratory work, as follows:

Lecture exams (69% of total)	**% of Total Grade**
First midterm Exam	23%
Second midterm Exam	23%
Final Exam (**not comprehensive**)	23%
Laboratory (31% of total)	
Laboratory Practical Exams (2 at 8% each)	16%
Formal Scientific Report	6%
Informal Reports (3 at 3% each)	9%

Lecture exams will feature a mixture of short-answer questions, the answers to which might be a few words, phrases, or at most, sentences, short essays, matching, fill in the blank, and multiple choice questions. Final assignment of a course grade may include an adjustment of up to 1/3 of a grade (using + or - grading). Our use of this option will be based on a consistent and obvious pattern of improvement of your test scores during the quarter and/or our subjective evaluation of your attendance and participation in both lecture and lab as well as departmental seminars.

Makeup exams will be given **ONLY** if you are excused from the exam **BEFORE** the scheduled date, or, in the event of illness, you have a note from a health professional confirming that you were unable to take the exam during the scheduled time.

Reading Assignments: The reading assignments listed in the lecture schedule below are from Campbell and Reece, 6th edition. Unless amended in class, all of the above reading assignments are required. In view of the limited number of lectures on each topic, you are expected to have read the assigned material **before you come to lecture**. In many cases, the lecture material will assume that you are familiar enough with the topic for us to emphasize material that may be more difficult to comprehend or that will go beyond that covered in the textbook.

Biology 206 Lecture Schedule Winter 2003

Date	**Topics**	**Assignment** Chapter: pages
Week 1: 1/7 – 10		
T	DS/JY/JG Introductions	
W	JY1 Plant Structure and Growth I	**35:** 720 - 728
F	JY2 Plant Structure and Growth II	**35:** 729 - 738
Week 2: 1/13 – 17		
M	JY3 Plant Structure and Growth III	**35:** 738 - 745
T	DS1 Animal Form and Function	**40:** 834 - 842 & 844 - 847
W	DS2 Regulating Internal Environment I	**40:** 842 - 844 & **44:** 925 -936
F	JY4 Transport in Plants I	**36:** 748 - 755
Week 3: 1/20 – 24		
M	***Holiday***	
T	JY5 Transport in Plants II	**36:** 754 - 757
W	JY6 Transport in Plants III	**36:** 759 - 762
F	JY7 Transport in Plants IV	**36:** 762 - 764
Week 4: 1/27 – 31		
M	DS3 Circulation in Animals I	**42:** 871 - 882
T	DS4 Circulation in Animals II	**42:** 874 - 875
W	DS5 Gas Exchange in Animals I	**42:** 886 - 890
F	DS6 Gas Exchange in Animals II	**42:** 890 - 894
Week 5: 2/3 – 7		
M	***Hour Exam #1 (Through Circulation in Animals II)***	
T	DS7 Gas Exchange in Animals III	**42:** 894 - 897
W	DS8 Water Balance and Excretion I	**44:** 925 - 926 & 936 - 943
F	DS9 Water Balance and Excretion II	**44:** 943 - 952
Week 6: 2/10 – 14		
M	JY8 Plant Nutrition I	**37:** 767 - 771
T	JY9 Plant Nutrition II	**37:** 774 - 779
W	DS10 Animal Nutrition I	**41:** 850 - 859 & 867
F	DS11 Animal Nutrition II	**41:** 589 – 868

Date	Topics	Assignment Chapter: pages
Week 7: 2/17 – 21		
M	***Holiday***	
T	***Hour Exam #2 (Through Animal Nutrition II)***	
W	JY10 Plant Reproduction and Biotech. I	**38:** 783 – 788
F	JY11 Plant Reproduction and Biotech. II	**38:** 788 – 794
Week 8: 2/25 – 28		
M	JY12 Plant Reproduction and Biotech. III	**38:** 788 - 797
T	JY13 Plant Response to Signals I	**39:** 802 - 806
W	JY14 Plant Response to Signals II	**39:** 806 - 810
F	JY15 Plant Response to Signals III	**39:** 810 - 817
Week 9: 3/3 – 7		
M	JY16 The Power of Movement in Plants	**39:** 817 - 824
T	*To be announced*	
W	DS12 Chemical Signals in Animals	**45:** 955 - 960 **11:** 199 - 212
F	DS13 Nervous Systems I	**48:** 1022 - 1034
Week 10: 3/10 – 14		
M	DS14 Nervous Systems II	**48:** 1034 - 1042
T	DS15 Sensory Reception	**49:** 1057 - 1069
W	DS16 Movement and Locomotion I	**49:** 1075 - 1080
F	DS17 Movement and Locomotion II	**49:** 1080 - 1086
Finals Week: 3/17		
M 8:00 – 10:00 am	***Final Exam (From Plant Reproduction I through Movement and Locomotion II + Animal Development from lab)***	

Supplemental Readings:

The following references are available at the reserve desk in Wilson Library. These books provide more detailed information on animal physiology, morphology, and environmental adaptations than is available in your text. You are encouraged to become familiar with these references and use them when you need more information on a specific topic.

Brusca & Brusca, 1990 – “Invertebrates”

Hill, 1976 -- "Comparative Physiology of Animals"

Schmidt-Nielsen, 1972 -- "How Animals Work"

Schmidt-Nielsen, 1975 -- "Animal Physiology: Adaptation and Environment"

Laboratory: Participation in the laboratory is mandatory.

The laboratory work is designed to provide an introduction to the structure and function of the major groups of plants and animals. Accordingly, you will find a mixture of anatomical, physiological, and behavioral exercises. In the anatomical exercises, there will be a large amount of material to study in a very short period. Our expectation is that these exercises will provide you with a general appreciation of structural organization in different groups of organisms covered in this course. There will be two **laboratory practical exams** based on the anatomical exercises. These exams will be held on the evening of **Tuesday, February 11th** and **Tuesday, March 11th**. The lab practical exams will emphasize the most obvious and general anatomical features. To help you organize this anatomical information, you will be required to keep a **laboratory notebook** in which you record your major observations and conclusions regarding the structure of the animal groups you study. This notebook will not be graded, but you will find it very useful in preparing for the practical exam. We have designated specific periods in which the anatomical work is to be done. If you do not finish during that period, some preserved material will be available for a few weeks to allow you to catch up during your spare time. Note that it is expected that you will need to put in at least 2 hours per week in addition to the scheduled hours for the lab to which you have been assigned. We strongly encourage you to invest this time, so that you can avoid falling too far behind.

You will be conducting four different experiments during the quarter. During the first laboratory you will set up: 1) an experiment on nutrient deficiency symptoms in plants and 2) an experiment on the effect of light intensity on plant growth. These two experiments will be monitored throughout the first half of the quarter. On Feb. 20th, you will conduct an experiment on arthropod physiology or behavior. Finally, on March 6th, you will conduct an experiment on the effect of temperature on respiration of a poikilotherm (goldfish) and a homeotherm (mouse). Data from these experiments should be recorded in your lab notebook as you are doing the experiment. A formal written scientific report will be required for either the experiment conducted in the arthropod physiology and behavior experiment or for the plant nutrient deficiency experiment (you may choose which of these to write up formally). The formal scientific report should conform to the standard format used for papers published in biological journals. **The format is briefly discussed on pages 104 - 111 in the lab manual and is covered in detail in Knisely's writing handbook**. Your data must be worked up in an appropriate form and neatly presented in graphs or tables in the report. Presentation of raw data without any form of analysis will not be acceptable. An exhaustive literature review is not expected in this report, but you should cite at least some material from original research papers, reference books or textbooks. For the remaining three experiments, you will be expected to submit a short informal report that is structured like the Results and Discussion sections of a formal scientific paper. In these reports, you will be expected to work up the data, present it neatly in graphs or tables, and interpret it in the same way you did for the more formal report.

Exam Schedule:

Feb. 3rd	Monday	Hour Exam #1	In class
Feb. 11th	Tuesday	Lab Practical #1	7 – 8 PM BI 355
Feb. 18th	Tuesday	Hour Exam #2	In class
Mar. 11th	Tuesday	Lab Practical #2	7 – 8 PM BI 355
Mar. 17th	Monday	Final Exam	8 – 10 AM

Report Due Dates:

Feb. 6th	Thursday	Plant light intensity report
Feb. 24th	Monday	Arthr. phy. & behav. reports (informal or formal)
Feb. 27th	Thursday	Plant nutrient exper. reports (informal or formal)
Mar. 14th	Friday	Respiration report due

BIOL 206 LABORATORY SCHEDULE

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Jan. 9	Anatomy and Morphology of Vascular Plants I: cells & tissues, primary growth (roots). Start experiment on mineral nutrition: nutrient deficiency symptoms in plants. Start experiment on the effect of light intensity on plant growth and development.
Jan. 16	Anatomy and Morphology of Vascular Plants II: primary growth continued (stems & leaves), secondary growth and wood anatomy.
Jan. 23	Major characteristics of plants I: Body plans, reproduction (bryophytes – gymnosperms).
Jan. 30	Major characteristics of plants II: Body plans, reproduction (gymnosperms – angiosperms). Terminate plant light intensity experiment.
Feb. 6	Arthropod Physiology and Behavior Experiment.
Feb. 13	Acoelomate, pseudocoelomate, and Eucoelomate Animals. Terminate plant nutrient deficiency experiment.
Feb. 20	Protostomes: Phylum Mollusca & Phylum Arthropoda.
Feb. 27	Lower Deuterostomes: Phylum Echinodermata, Phylum Chordata (Subphylum Cephalochordata and Subphylum Vertebrata)
Mar. 6	Effect of Temperature on the Respiration of a Poikilotherm and a Homeotherm. Anatomy of the Fetal Pig.
Mar. 13	Embryology of the Frog – Morphogenesis of the Vertebrate Body (lecture, video clips and animations, and observations on living frog embryos. Plant reproduction: pollination, fertilization, and embryogenesis.