CHESAPEAKE COLLEGE
WYE MILLS, MD 21679
DIVISION OF ARTS AND SCIENCES
Science Department

COURSE OF STUDY
Spring, 2009

I. Course number and title: **BIO 113:** Principles of Biology II

Instructor: Gregory S. Farley
Office S-118
410-822-5400 ext. 389
gfarley@chesapeake.edu

Office Hours: M: 1:00 – 3:00
W: 1:00 – 3:00
Th: 10:00 – 11:00
Other times by appointment

Course Schedule: Lecture: Tuesday, Thursday 8:30 – 9:45am
Lab: Tuesday, 9:50 – 11:30am **AND OCCASIONAL THURSDAYS**

II. Course description:

The second of two courses designed specifically for students who plan to major in biology. Content focuses on organismal biology, evolutionary diversity of living organisms, behavior and ecological interactions that occur among species. The laboratory complements theory by utilizing the scientific method in experiments to enhance expertise in the use of laboratory equipment. Three hours theory, and two hours laboratory per week. (4 credits) Prerequisite: BIO 111.

III. A. Course objectives:

1. To study organisms, systematically, individually and in an interrelated fashion by researching evolutionary diversity and behavior.
2. To provide students with laboratory experiences to develop laboratory and documentation skills.
3. To apply the scientific method in solving specific case studies, using information literacy resources.
4. To use appropriate scientific terminology to facilitate communication.
5. To use technology to complete projects (in cooperation with the LRC).

IV. Specific objectives: Specific objectives are found in three places: in the text, in the laboratory manual, and in this syllabus. At the end of the course, the student should be able to:

1. Apply the scientific method in the theoretical and laboratory settings, using information literacy skills and resources.
2. Identify organisms, discuss their forms, structures and functions, and discuss the evolutionary relationships among taxa, for the following groups:
   Viruses, Bacteria, Archaea, Protista, Fungi, Plantae, and Animalia
3. Demonstrate a working knowledge of plant structure, function, life cycles, and phylogeny.
4. Demonstrate a working knowledge of fungal structure, function, life cycles, and phylogeny.
5. Describe and identify the various members of the Protista, and discuss the hypotheses of relationship, or lack thereof, within the protist kingdom.
6. Identify and describe the developmental stages occurring in higher plants and animals.
7. Identify embryonic germ layers in animals, and list the structures that develop from each.
8. Discuss evolution at the molecular and phenotypic level.
9. Differentiate between population biology, ecology, behavioral biology, and evolutionary biology.
10. Discuss and critique research in evolution, systematics, animal behavior, and ecology.

V. Course outline:

DATE:	Reading Assignment	Chapter(s)
Jan. 22	Introduction, review of evolution	REVIEW 22-24
Jan. 27	Phylogenetic systematics / cladistics	26
Jan. 29	Viruses, Bacteria, and Archaea	19; 27
Feb. 3, 10	The Protists	28
FEB. 5:	**GLOBAL WARMING TEACH-IN: SPECIAL TOPICS**	
Feb. 12	Review/Overflow information; PROTIST PRESENTATIONS	
Feb. 17	**Exam 1: Evolution, Systematics, Viruses, Bacteria, Archaea, Protists**	
Feb. 19, 24	Plant Structure and Function	SKIM 35-39
Feb. 26, Mar. 3	Plant Diversity	29, 30
March 5, 10	Fungal Structure, Function, Diversity	31
Mar. 12	Review/Overflow information; PLANT/FUNGUS PRESENTATIONS	
Mar. 16 – 20	***No Classes: Spring Break***	
Mar. 24, 26	Animal Structure and Function, Development ***EXAM 2 DUE***	SKIM 47, SKIM 40-50 (!)
Mar. 31, April 2	"Lower" Invertebrates	32, 33
Apr. 7, 9	Animals: Protostomes	33, 40, 47
Apr. 14, 16	Animals: Deuterostomes	33, 34
Apr. 21	Review/Overflow information/ ANIMAL PRESENTATIONS	
Apr. 23	**Exam 3: Animals**	
Apr. 28, 30, May 5	Behavior, Population Biology, Ecology, Biomechanics	50-53, 54
TBA, May 6-12	**Final examination - Take-home comprehensive**	

*** Alternative Learning experiences will be scheduled to meet outside of class time.**

VI. Required texts:

Theory: Campbell, N.A., and J.B. Reece. (2008). Biology, 8th edition. San Francisco, CA: Benjamin Cummings. (ISBN 978-0-8053-6844-4)

Laboratory: Mader, S.S. (2006). Biology, 9th edition (laboratory manual).

VII. Methods of teaching:

Lecture, discussion, cooperative learning, group projects, laboratory sessions (macroscopic observation, microscopy, biochemistry, biotechnology, dissection), current topics. A/V materials may include handouts, VHS cassettes, CD-ROM and DVDs to supplement content.

VIII. Methods of evaluation:

The following grade scale will be used:

Grade	Range
A	90-100
B	80-89
C	70-79
D	60-69
F	Below 60

All examinations will be announced in class and will consist of essay type questions.

Attendance at any test or examination is mandatory. There will be **NO** make-up examinations. **If, for any reason, a student is not able to take a test, the student must DIRECTLY contact the instructor BEFORE (not during or after) the scheduled test**.

IX. Evaluation Criteria

1. Theory Testing	
Three tests, 15% each	45%
Cumulative final exam	15%
2. Lab Grade:	
Two practical quizzes, 10% each	20%
Lab report (1)	5%
Lab report peer reviews (2 @ 2.5% each)	5%
3. Written Assignment	5%
4. Oral Presentations	5%

X. Attendance: As stated in the Chesapeake College catalog

Learning is facilitated with student involvement, interest and motivation and attendance. Therefore, students are expected to attend all classes and laboratories. Attendance is clarified by the instructor. In the event that a class is missed, it is the student's responsibility to make up any missed work, as the student will be held responsible for all materials covered.

Students are responsible for attending field experiences, and attendance will be assessed at these out-of-the-classroom activities.

All electronic devices (beepers, cell phones, etc.) will be turned off during instructional times.

XI. **References**:

Alberts, B., A. Johnson, J. Lewis, M. Raff, K. Roberts, and P. Walter. Molecular Biology of the Cell, 4th edition. Garland Publishers, 2002.

Brusca, R.C. and G.J. Brusca. Invertebrates. Sinauer Associates, 2003.

Bryson, B. A Short History of Nearly Everything. Broadway Books, 2003.

Davenport, R. An Outline of Animal Development. Addison-Wesley Publishing Co., Inc., 1979.

Folger, T., *series editor*. The Best American Science and Nature Writing. Houghton Mifflin, Boston. *Published annually.*

Funk, V.A., E.O. Wiley, D.R. Brooks, and D. Siegel-Causey. The Compleat Cladist: A Primer of Phylogenetic Procedures. University of Kansas Natural History Museum, 1991.

McMillan, V. Writing Papers in the Biological Sciences, 3d ed. Bedford/St. Martin's, 2001.

Sagan, C. The Demon-Haunted World: Science as a Candle in the Dark. Ballantine Books, 1997.

Vermeij, G. Evolution and Escalation. Princeton University Press, 1987.

Vogel, S. Life's Devices. Princeton University Press, 1988.

Wainwright, P.C. and S.M Reilly, eds. Ecological Morphology. Univ. of Chicago Press, 1994.

Zimmer, C. Evolution: The triumph of an idea. Harper and Collins, 2002.

Martin, R.A. Missing Links: Evolutionary Concepts & Transitions Through Time. Jones & Bartlett Publishers, 2004.

The following is a list of some GREAT BOOKS OF BIOLOGY, listed in a chronological approach.

The Origin of species, by Charles Darwin, 1859.
Voyage of the H.M.S. Beagle, by Charles Darwin, 1909.
Microbe Hunters, by Paul DeKruif, 1926.
What is Life?, by E. Schroedinger, 1956.
Silent Spring, by Rachel Carson, 1962.
The Two Cultures, by C.P. Snow, 1964.
Science and Human Values, by Jacob Bronowski, 1965.
The Double Helix, by James D. Watson, 1968.
The Sand County Almanac, by Aldo Leopold, 1968.
The Population Bomb, by Paul Ehrlich, 1968.
The Structure of Scientific Revolutions, by Thomas S. Kuhn, 1970.
The Medusa and the Snail, by Lewis Thomas, 1974.
Rosalind Franklin and DNA, by Anne Sayre, 1975.
Sociobiology, by E.O. Wilson, 1975.
Lives of a Cell, by Lewis Thomas, 1976.
The Selfish Gene, by Richard Dawkins, 1976.
Ever Since Darwin, by Stephen J. Gould, 1977.
The Dragons of Eden, by Carl Sagan, 1977.
On Human Nature, by E. O. Wilson, 1978.
The Panda's Thumb, by Stephen J. Gould, 1980.
The Mismeasure of Man, by Stephen J. Gould, 1981.
Growth of Biological Thought, by Ernst Mayr, 1982.
(Carter, J.L. & Mayer, W.V. (1988). Reading beyond the textbook: great books of biology. BioScience, 38 (7), 490-492.)

BIO 113: Laboratory Schedule
Instructor: G.S. Farley Spring, 2009

Date:	**Laboratory exercise**
Jan. 27	Phylogenetic exercise (Handout)
Feb. 3	Advanced microscope use; Kingdom Monera (14)
Feb. 10	Kingdoms Monera and Protista (14)
Feb. 17	Seedless plants (16) Seed Plants (17)
THURSDAY, FEB 19: Set up Germination Experiment	
Feb. 24	Flowering Plants (18) Reproduction in plants (21)
Mar. 3	Kingdom Fungi (15)
THURSDAY, MAR. 5: Collect Experimental Data	
Mar. 10	**PRACTICAL EXAM #1; LAB REPORT DUE**
THURSDAY, MAR. 12	Animal Organization (25) Animal Development (32)
Mar. 19 *SPRING BREAK – NO LAB*	
Mar. 24	Animalia: Sponges, Cnidarians (22) **LAB REPORT PEER REVIEWS DUE**
Mar. 31	Animalia: Platyhelminthes, Nematoda (22) **LAB REPORT RE-SUBMISSIONS DUE**
Apr. 7	Animalia: Mollusca, Annelida (23)
Apr. 14	Animalia: Arthropoda (23)
Apr. 21	Echinoderms (23) Mammalia (26, 27)
Apr. 28	Biomechanics and growth allometry (handout)
May 5	**PRACTICAL EXAM #2**

* Labs must be read before coming to lab. Be ready to start the lab promptly.
DRESS APPROPRIATELY FOR LABS: in the lab, no shorts, open-toed shoes, nor flip-flops.

The lab schedule may be changed to meet the learning needs of the students and provide for field experiences.

Writing Assignment:

There are at least 5 major extinction events written into the fossil record.

Working in teams of three, identify one major extinction event. Then, using every valid source available to you, identify the best hypothesis (or hypotheses) that attempt to explain these extinctions, and assemble the data that support each hypothesis. Which data set seems most probable? Most improbable?

Your assignment should take the form of an essay, 1000-1200 words, which is to be co-authored by all three participants. Participants will be graded on their paper and on peer reviews of their participation, so all team members will not necessarily share the same grade.

For my use in course evaluation: **BIO 113**

Topic	**Grade**	**Laboratory**	**Grade**
Test 1 (15%)		Lab Practical Exam 1 (10%)	
Test 2 (15%)		Lab Practical Exam 2 (10%)	
Test 3 (15%)		Lab Report 1 (5%)	
Final exam (15%)		Peer Review 1 (2.5%)	
Writing (5%)		Peer Review 2 (2.5%)	
Oral Presentations (5%)			
Theory Average (70%)		**Lab Average (30%)**	

Course Number & Section: __**Bio 113**___

Spring, 2009
INSTRUCTOR'S NAME: G. S. Farley

This is to certify that I _____ have received a copy of the course outline and that it has been explained to me. I have read the outline and have agreed to the evaluation criteria as stated.

Sign: _____

Date: _____

SEPARATE HERE AND GIVE THE BOTTOM COPY TO YOUR INSTRUCTOR

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