Organisms, Evolution, and Ecosystems (Bio 112)
COURSE SYLLABUS
SPRING 2009

COURSE DESCRIPTION:
Introduction to organismal and superorganismal biology. Topics include evolution, ecology, conservation, and animal physiology.

Meeting: Tuesday and Thursday 8:30-9:45 Dana 146
Lab – Mon 130-420 PM or Tues 1:00-3:45 PM - Watson 119

Instructor: Dr. Michael E. Dorcas
Phone: 894-2727
Office: Room 290, Watson
Web: www.bio.davidson.edu/dorcas
E-mail: midorcas@davidson.edu

Office hours: by appointment or just drop in.

IMPORTANT: I use e-mail as a regular form of communication in the class and I expect that you will as well. **You should check you e-mail at least once daily.**

REQUIRED READINGS:
1. *Life: The Science of Biology - Eighth Edition* - Purves et al. Sinauer and Freeman Presses.
2. *Laboratory Handouts/Manual* online (www.bio.davidson.edu/dorcas)
3. Scientific and popular articles assigned periodically and put on reserve in the library.

OTHER RESOURCES: An excellent resource to access is the LifeWire internet page: (http://www.thelifewire.com), which has information, practice quizzes, animated tutorials, activities, and suggested readings for each chapter.

Scientific Literature - The library offers bibliographic assistance for research projects. Services available include assisting with literature searches, instruction in database search techniques, research consultations, and any other help that he may be able to provide students wading through the plethora of available information. No appointment is necessary. Those who have taken advantage of this service seem to agree it was time well spent.

Writing Center - http://www.davidson.edu/academic/english/writing_center/index.html

Speaking Center - The Speaking Center @ Davidson College offers the services of trained student tutors to support speaking across the curriculum. At **any** point of the process, from selecting a topic to delivering the speech, the Center can assist your students in learning to speak, and speaking to learn. *No appointment is necessary*; tutors see students on a first-come, first-served basis.

Located in Chambers B39 in the north basement, along with the Writing Center, the Speaking Center includes private rooms, a camera and playback equipment, and resource materials to help students collaborate with tutors. Students wishing to keep copies of their presentations can bring recordable DVDs (available in the Bookstore).

The Speaking Center will be open **Sunday through Thursday from 9-11 pm** starting Sunday, January 25th. Tutors for the spring semester include Sara Bates '11, Jess Bradshaw '09, Jenn DeKnight '10, Kristina Johnson '10, Danielle Lokaj '09, Betsy Lyles '11, Alexandra McArthur '09, and BJ Youngerman '10.

COURSE OBJECTIVES

To develop an appreciation for the biological sciences at the organismal level and beyond.

To provide an opportunity to become familiar with current issues in organismal biology, ecology, and physiology.

To provide hands-on experience in developing questions in organismal biology, developing investigations to answer those questions, and presenting those results to others.

To develop the ability to think critically about problems in organismal biology and write about them in an effective manner.

To develop and use skills such as dissection, computer programs, and data analysis and presentation that transcend course content.

GRADING:

Regular exams in class (two, closed book)	50%
Final Exam – Exam Center (Comprehensive, closed book)	25%
Laboratory	25%

Grading Scale:

A = 100 - 93; A- = 92-90
B+ = 89-87; B = 86-83; B- = 82-80
C+ = 79-77; C = 76-73; C- =70-72
D+ = 69-67; D = 66-60
F. 59

EXAMS

The exams will be taken during lecture and will cover material from lectures, text readings, miscellaneous assigned readings, and the laboratories. Exams will cover material through the lecture period before the exam. The final exam will be comprehensive and will be taken through the exam center. All exams are closed book/closed notes exams. If you must miss a scheduled examination for any acceptable reason, you must contact me BEFORE the exam.

CLASS PARTICIPATION AND ATTENDANCE

Everyone is expected to actively participate in class, both in lab and lecture. To actively participate, you **must come to class on time and be prepared for class.** Everyone is expected to have read and be familiar with the material we are covering and associated papers before we cover them in class. I will periodically call on you to answer questions or lead discussions during class, so be ready. Your final grade will be reduced if you do not adequately participate.

You are expected to be in class and be on time. You must initial the roll sheet each day you are here. Excessive absences will result in a reduction of your grade. To receive a passing grade in this class, you cannot be absent for more than five lecture classes. You cannot miss any labs without a legitimate reason.

ANIMAL USE

This class requires the use of a live animals and preserved animals. If you have a problem with the use of animals in research or teaching or if you have a problem with the sacrificing of animals for scientific experiments, **you should talk to me immediately**. **Do not** wait until the laboratory when we use the animals – that will be too late.

ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

Full accommodations are the legal right of students with all kinds of disabilities, whether learning disabilities or physical disabilities. I am happy to provide these accommodations. If you are a student with a learning disability documented by Davidson College who might need accommodations, please identify yourself to me within the first week of class, so that I can learn from you as early as possible how to best accommodate your needs. All such discussions will be fully confidential unless you otherwise stipulate.

LECTURE AND EXAM SCHEDULE: The schedule below should be considered tentative and the dates and topics may change as the class progresses. At the beginning of each lecture, I will provide you with an update of where you should be in your readings. You should stay at least one class period ahead in your readings.

Week 1 (January 13 and 15)
Introduction to course
Introduction to Biology, History of Evolutionary Thought, Evolution, Adaptation, Natural Selection, Fitness
Chapters 1, 22

Week 2 (January 20 and 22)
Continue Evolution, Natural Selection, and Fitness - *Chapters 22*
Begin Mechanisms of Gene Frequency Change, Types of Selections, Microevolution, Population Genetics Hardy-Weinberg – *Chapter 22, 23*

Week 3 (January 27 and 29) – No Class Jan 29 – MD giving seminar at Drexel University
Species Concepts, Phylogenetics, and Molecular Evolution
Chapter 24, 25

Week 4 (February 3 and 5)
Upper-level diversity

Chapter 26, 27.1-27.2

Week 5 (February 10 and 12)
Diversity of Animals
Chapter 31-33
Exam One - Feb 12

Week 6 (February 17 and 19)
Animal Behavior, Behavioral Ecology
Chapter 53

Week 7 (February 24 and 26)
Physiology, Homeostasis, Temperature Regulation
Chapter 40

Week 8 (March 3 and 5)
SPRING BREAK

Week 9 (March 10 and 12)
Gas Exchange and Circulation
Chapter 48, 49

Week 10 (March 17 and 19)
Animal Reproduction
Chapter 42

Week 11 (March 24 and 26)
Animal Nutrition and Digestive Systems
Chapter 50

Week 12 (March 31 and April 2)
Sensory Systems
Chapter 45

Week 13 (April 7 and 9)
Exam Two – April 9

Week 14 (April 16) – April 14 is Easter Break
Population Ecology, Patterns of dispersion, Density, Demography, Life histories, Population Growth, Regulation of Population Size
Chapter 54
Community Ecology, Species Interactions, the Niche Concept, Succession, Biodiversity
Chapter 55

Week 15 (April 21 and 23)
Continue Community Ecology
Chapter 55

Week 16 (April 28 and 30 [optional day])
Biogeography
Chapter 56
Conservation Biology
Chapter 57

Week 17 (May 5 [optional day)
Plant Anatomy and Structure; Reproduction
Chapter 34, 38

FINAL EXAM (TBA)

LABORATORY (25% of total grade)

Each week we will conduct an investigation focusing on the topic or topics discussed in lecture. Some laboratory experiments may require data collection over several days and you will be required to come into the laboratory during non-class hours to complete the project. Complete understanding of laboratory sessions will depend heavily on a thorough understanding of the lecture material and assigned readings. Generally, you will work in groups of three or four, but may work in pairs. Discussion of questions posed during each laboratory is expected within each lab group.

For one of the labs, you must analyze your data and write a short group report (no more than five typed, double-spaced pages). I will discuss this in class in great detail. The report should take the form of a short scientific paper. This includes: (1) an introduction describing the objective(s) of the experiment, (2) the methods used to achieve the objective(s), (3) a concise summary of the results, (4) a short discussion and interpretation of the results, (5) literature cited. Graphs and/or tables illustrating your results should be included in each report.

ANIMAL USE

This class requires the use of a live and dead animals. If you have a problem with the use of animals in research or teaching or if you have a problem with the sacrificing of animals for scientific experiments, **you should talk to me immediately**.

Your laboratory grade will consist of the following:

Scientific Paper – LAP or goldfish lab	40%
Oral Presentation	20%
Graded Dissection	07%
Dissection Practical	33%

Laboratory Schedule

January 12/13	Lab Introduction and Orientation
January 19/20	NO LAB – MLK day
January 26/27	Evolution Mechanisms – Simulations – planning for Pop Gen
February 2/3	Population Genetics – "LAP Lab"
February 9/10	Population Genetics – "LAP Lab" – data analysis
February 16/17	Presenting and Analyzing Biological Data
February 23/24	Goldfish Physiology
March 2/3	NO LAB – SPRING BREAK
March 9/10	Fetal Pig Anatomy

March 16/17	Fetal Pig Anatomy
March 23/24	Fetal Pig Anatomy (Finish and Review)
March 30/31	Practical Exam (Fetal Pig Anatomy)
April 6/7	BioBlitz - Davidson College Ecological Preserve
April 13/14	NO LAB – EASTER BREAK
April 20/21	BioBlitz - Davidson College Ecological Preserve
April 27/28	Oral Presentations – CONSERVATION BIOLOGY