

**Ethology and Behavioral Ecology (Bio 287)  
Spring 2008 Course Information**

<b>Instructor:</b>	Ken Prestwich
<b>Office:</b>	108 O' Neil
<b>Office Hours:</b>	M 7:15 – 8:15AM & 4:00 – 5:30PM T: 2:00 - 3:30PM (3:15PM on days with faculty meetings) W: 1:00 – 2:30PM Th: 7:15 – 8:45AM Please note that I will need to cancel office hours sometimes this semester due to a heavy commitment of committee work. Also note that I do not have office hours on days where review sessions are scheduled.
<b>Review Sessions:</b>	We will have review sessions in the late afternoon as needed. You are encouraged to attend these.
<b>Required Text:</b>	<i>Principles of Animal Behavior</i> 1st Edition. 2004. L. A. Dugatkin. W. W. Norton. ISBN 0-393-97659-9
<b>Course Website URL:</b>	<a href="http://www.holycross.edu/departments/biology/kprestwi/behavior/">http://www.holycross.edu/departments/biology/kprestwi/behavior/</a>

**General Course Goals:** Classically, ethology is the study of animal behavior viewed through the lens of evolution and behavioral ecology examines the relationship between an animal's behaviors and its environment. By contrast, the approach classically taken in comparative psychology concentrates on learned behavior and is less concerned with the adaptive nature of behavior.

Although entitled "Ethology and behavioral ecology", this course is really about the modern synthesis of the study of animal behavior. This synthesis breaks down the old walls between learning and evolutionary studies mentioned above. The old camps (especially ethology vs. comparative psychology) viewed the development of behavior as being due to either "nature" (genes and evolution) or nurture (experience and learning). The modern synthesis instead dwells on the complex interplay of genetic and environmental factors in determining the behavioral phenotype. Thus, the breakdown of old notions of nature (genes and evolution) vs. nurture (learning and experience) is perhaps the over-riding theme of this course. What the dedicated student will learn about behavior will serve in their understanding of any element of the phenotype.

In the process of gaining this broad overview, we will learn some of the most important theoretical and experimental methods used by animal behaviorists. This exploration will tend to follow the theoretical framework provided by the great ethologist Niko Tinbergen whereby behavior is studied in terms of its:

- **Proximate causes.** These include the physical mechanisms that produce behavior (the nervous system and effectors) and how genes and experience (environment) interact over time to change the details of the structures that produce behavior, and as a result, change the behavior itself (the development or ontogeny of behavior).

- **Ultimate causes.** These are the evolutionary forces that shape behavior. We will consider how behaviors evolve within populations over time (i.e., the evolutionary history of a behavior and how ethologists reconstruct this evolution) and we will examine the environmental agents that result in the evolution and maintenance of specific behaviors (the stuff of behavioral ecology). This will include the evolution of learning mechanisms.

**Alas**, this course is not primarily descriptive and we will not spend time watching "Nature Channel" films of furry animals and birds cavorting about in exotic places. A number of folks often express surprise that we do not dwell on such scenes. Please realize that our main purpose is to understand behaviors as adaptations. Thus, the course is mostly about evolutionary theory and the mechanism and development of behavioral phenotype.

**Lecture/Assignment Schedule:** The schedule of all assignments can be found at the course website (see box on page 1). The site is updated after each class to reflect our actual progress.

**Class Format:** Class will be a mix of discussion and lecture. There will be text, handout, and literature readings assigned before most classes. You will usually be given questions to guide your reading. I fully expect that you will have read the material, answered the questions, and studied **before** coming to class. In class, I will discuss some of the most important and difficult points in the reading and add additional material. I will ask questions during class based on the reading assignments and on what was discussed in previous classes. I have a strong expectation that you will:

- Arrive ready to work and participate
- Be prepared for each class
- Not miss class;
- Not arrive late (although late is always better than not at all)
- Not leave the classroom unless it is absolutely necessary

Learning in this class is a collaborative effort. Following the steps above will be beneficial both to you and to all members of our class community and will maximize everyone's enjoyment and benefit of the course.

**More About Class Discussion:** Discussion has a crucial role in this class since it gives me a chance to be sure that everyone understands the reading material (much of which will not be covered directly in lecture) and because it gives us a chance to deepen our understanding of behavior. Being active in discussion, while difficult for some, will pay great rewards in the long run, not only in this course but also in many of your future endeavors. Respectful, civil honest discourse will be the basic ground rule of all discussion.

Discussion will be largely based on the readings for class and on questions that you will bring up for consideration. I will assume that all students in the class should either be able to answer the study questions (by having done

the reading) or can formulate a reasonable question seeking more explanation of the reading (*i.e.*, something a little more sophisticated than "please go over that material" -- this smacks of not having done the reading!). Good participation implies more than simply restricting your answers to the "softball" questions I use to start discussion. Therefore, expect to be called on to speak and be ready to volunteer your well-considered ideas or questions.

**Please note that I call on students as often as I ask for volunteers to answer. If you are truly unprepared, I would rather have you in class than not. Tell me you did not prepare before class and I will try to avoid calling on you. Please don't do this more than a few times all semester.**

You will be graded on class discussion (more grading details are below). Participation is about 11% of your grade and is determined each week. I use a one-week basis because some classes have less opportunity than others for participation. Here are general guidelines I use in coming to participation grades.

- Unexcused absence (no Dean's excuse) gets a zero.
- Showing up for class and saying nothing will earn you 0.20.
- Being obviously prepared and participating by answering questions voluntarily or being called on or by asking good questions that advance class understanding will all earn you something up to maximal points, depending on how I judge the quality of your work and preparation.

You will get your current participation grade each time I return an exam; it will be a number between 0 and 1 indicating the fraction of participation points you are presently earning. Thus, participation must be consistent throughout the semester to earn the best possible mark – miracle improvements at the end or great starts followed by lack of involvement to do not constitute a semester's work. Note that participation grades commonly make a significant difference in ones final grade (in theory a whole letter grade but in honesty less since few skip every class!).

**An important note about class reading assignments.** I have become increasingly tired of certain percentage of individuals who consistently take advantage of discussion to avoid carefully reading class assignments. Trust me, it is usually pretty obvious who is doing this. Please do the reading. Remember that we do not discuss everything from readings that might show up on an exam. The reading study questions are complete and if you can accurately and thoroughly answer these, you will do fine on the exams and in discussion.

**Discussion Leadership:** Pairs of individuals will organize and lead discussion of papers that everyone will read. Each group will lead once and will be given a maximum of 15 minutes. More detailed instructions will appear on the website by the end of the first week of classes.

**Grading:** Grades will be determined as follows:

<b>Project</b>	<b>Points</b>
Mid-term exams -- two, worth 100 pts. each – second is comprehensive	200 (~27 %)
Comprehensive Final Exam	200 (~27 %)
Take home essay (40 pts.)	40 (~5%)
Group discussion leadership	40 (~5%)
10 Page Research Paper	100 (~14%)
"Field exercises" (ethogram and either optimal foraging or acoustics (40 pts each)	80 (~11 %)
Class Participation	70 (~10 %)
<b>Total</b>	<b>730</b>

**Grading Scale:** Grades are based on a scale, not a curve. I use the following scale (averaged to whole percentages): above 93% = A, 93 to 90% = A-, 89 to 87% = B+, 86 to 83% = B, 82 to 80% = B-, 79 to 77% = B<sup>+</sup>, 76 to 73% = B, 72 to 70% = C<sup>-</sup>, 69 to 67% = D<sup>+</sup> and 66 to 60% = D. Any average below 60% fails. Thus to earn an A in this course you will need at least 679 points (730 \* 0.93). Similar calculations can be made for other grades.

**Exams:** Exams will consist of a **mix of essay questions, definitions, fill-ins, multiple choice and, when appropriate, problems.**

I am very concerned that you take something away from this course. The best way to become a good student of animal behavior is to constantly review old material in addition to learning new material. To encourage this, **all exams (second midterm and final) are comprehensive** -- any significant material covered at any time previously may show up on a test. The most likely candidate materials for retesting are topics that a significant number of individuals did poorly on (you will be told this). The final exam has a greater proportion of comprehensive material than the other exams (almost 50%) with the remainder dealing with material since the second midterm exam. Do not panic over the comprehensive nature of the exams! Most of the material on each exam will be "new" since the previous exam. I do not have a reputation as an unfair tester -- so, please rest assured that comprehensive questions will not deal with insignificant details. Keep up and review often!

**Take Home Questions:** On two separate occasions you will be given 30-point take-home questions whose purpose is to allow you sharpen your explanations of a few especially important topics (e.g., the roles of genes in behavior). Instructions will be given with the assignments.

**Practical Projects:** So that you can gain a bit of the feel of ethology, we do two out of class projects.

- We will construct an ethogram (a systematic inventory of behaviors) and use it to construct a kinematic diagram (this shows the likelihood that one behavior will be followed by another). We will use betta fish or crickets.
- Collection and analysis of **animal acoustic signals** (field -- pardon the jargon but not just any animal sound will do). Alternately, we may do an optimal foraging lab -- which we will do will depend on time and weather.

All of these are group projects (variable sized groups of two or three) and all involve a data collection phase which should take an hour or two (either independently or at agreed-upon meeting times) and then a short write up and perhaps presentation in class.

**Research Paper:** To give you a bit of ownership of the material, you will be required to write a 10-page (actual text) research paper on a topic of your choosing (and my approval). This will be a chance for you to become familiar with the animal behavior literature. You will receive an information sheet about the paper sometime in the first two weeks of the course; due dates are on the website.

**Problems:** A number of aspects of this course are mathematical and so some problems will be assigned. There will be no credit attached to these assignments; they are purely for study purposes. This said, a fatal error that is commonly made is to put little effort into solving the problems and then assume that looking at and understanding the posted solutions will suffice. It hardly ever does. Please be responsible and try hard to do the problems and come for help immediately if you cannot solve them.

**Distribution of materials is via the worldwide web, CHC intranet (local web) and via e-mail. I DO NOT USE BLACKBOARD** All study questions, problems, and the readings will be distributed electronically. These materials will be available well before we will discuss them in class. All of these files will be in Adobe Acrobat format. Note that files on the intranet are only available on campus.

On the rare occasions when I e-mail files to you as attachments, please **save the file first onto your P-Drive or desktop.** Then **launch Acrobat reader** and **open the file from within reader** or drag and drop the file on the Reader Icon. If you try to double click the files to open them or if you try to view them with the GroupWise reader, the results are unpredictable.

**If you are unable to get a file to open or print, the most likely cause is that something is wrong with the Adobe Acrobat Reader.** Either **re-install the program** or **go to another computer.** Please do not inform me that you cannot print something unless you have tried it on several machines -- I go to great lengths to be sure that all files will work before posting them.

Note that a number of materials will be only available from campus (they are on a closed version of the world wide web -- the CHC intranet).

**PowerPoint**: Powerpoints from lectures will be available before the lectures on the website. An updated version (in light of class) is typically posted sometimes afterwards. Note – the exams do not by any means come entirely from the PowerPoint notes and so the PP is no substitute from coming to each class prepared and ready to participate.