

## ECOL373: SOCIOBIOLOGY AND EVOLUTION OF COOPERATION FALL 2007

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Why do animals and other organisms sometimes compete and sometimes cooperate? How do organisms in groups interact, how do they organize themselves or make group decisions? This course will give you some answers to these questions. We will discuss how social behavior evolves, and how it changes the life style of the animals that display it. We will also discuss whether this research can teach us about human social behavior.

You will not only learn about the diversity of social systems, but also understand how ecology and evolution shape organisms and their behavior. You will learn to read and understand original scientific literature, and to critically discuss it. By giving a presentation in the course you will practice to structure and communicate what you have learned. This is an interdisciplinary course, and the readings will give you a variety of views on the evolution of behavior in animals and humans.

### **Course website**

The course website is located on d2l, at [d2l.arizona.edu](http://d2l.arizona.edu). You will be able to access it when the semester starts. You have to check this site regularly to obtain readings. You can also submit assignments and check your grades there. You can access the site from computers on campus. Note that student computer labs also offer printing services if you would like to print out readings. To access your course on D2L you must have a UA NetID and be officially enrolled in the course for at least 24 hours. Here is a tip sheet for how to use it: <http://help.d2l.arizona.edu/StudentTools/Tipsheet/StudentTipSheet.htm>

### **Textbook**

Gadagkar, R. Survival strategies: cooperation and conflict in animal societies. 1997, Harvard University Press.

Other required reading material will be available online.

### **Lecture outline**

0. Introduction; what is social behavior? How does science study it?
1. Diversity of social organisms
  - 1.1. Vertebrate social systems (mammals, birds, fish)
  - 1.2. Mating systems, family groups, delayed dispersal
  - 1.3. Social insects and other arthropods
  - 1.4. Colonial invertebrates
  - 1.5. Social microorganisms
  - 1.6. How can social groups be characterized?
2. Evolution of sociality and cooperation
  - 2.1. What is evolution and natural selection?
  - 2.2. Levels of selection
  - 2.3. Altruism and how it can evolve
  - 2.4. How does group living evolve? Advantages and disadvantages of social living

3. Mechanisms of social behavior
  - 3.1. Conflict and reconciliation; cheating, policing, deceptions, dominance
  - 3.2. Interactions in the group; communication, cues and signals, recognition
  - 3.3. Collective behavior; self-organization, division of labor
4. Human behavior?
  - 4.1. Heritability of behavior; nature and nurture; evolutionary psychology
  - 4.2. Human altruism
  - 4.3. Human mating systems
  - 4.4. Other human behaviors
  - 4.5. Effects on economics, politics, sociology, psychology; problems and advances in studies on humans

### **Student presentations**

Each student will be able to choose a topic that relates to the class (i.e., about a social behavior from an evolutionary perspective) for a 5 min presentation. A presentation should contain PowerPoint slides as visual aids, and the topic should be researched in the original scientific literature. Topics will be selected from a list or freely by students. Advice on how to prepare a presentation will be given in the lecture. Each talk should be based on at least one original research paper plus additional materials.

### **Assignments**

There will be four written assignments. Some of these will involve researching original scientific papers, summarizing their results, and expressing an own opinion about them. All assignments are short essays (<300 words) that will be graded on content, readability/structure as well as writing style and spelling/grammar. At the end of the semester, you will be allowed to revise and re-submit one of the assignments to get additional points.

### **Quizzes**

Frequently you will be asked to answer (in writing) a question about the current reading in class.

### **Exams**

There will be three exams (first, mid-term, final). The final exam will cover the whole course.

### **Grading**

Your final grade will be determined by the percentage of the total number of points accumulated from exams, the presentation, assignments, and class participation. You can check your current grade status any time on the website ([d2l.arizona.edu](http://d2l.arizona.edu)).

	<b>Points</b>	
First exam	10	A: 90-100 %
Mid-term exam	15	B: 80-89 %
Final exam	20	C: 70-79 %
Presentation	15	D: 60-69 %
Assignments (5 points each =)	20	E (fail): 0-59 %
Quizzes on readings	10	
Class participation	10	
Possible bonus points	(20)	
<b>Total points</b>	<b>100 (120)</b>	

### **More details on grading**

Assignment grading: The written assignments are short essays to practice your writing and literature research skills. They are graded as follows:

1 - essay on talk topic <ul style="list-style-type: none"> <li>• 1p style / spelling / grammar</li> <li>• 0.5p 200-300 words</li> <li>• 0.5p correct citation of sources</li> <li>• 1p clear question / topic</li> <li>• 1p for making it interesting to audience</li> <li>• 1p depth of understanding</li> </ul>	2 - paper summary <ul style="list-style-type: none"> <li>• 1p style / spelling / grammar</li> <li>• 0.5p 200-300 words</li> <li>• 0.5p correct citation of sources</li> <li>• 1p pointing out hypotheses tested</li> <li>• 1p describing how they are tested</li> <li>• 1p conclusion &amp; overall presentation</li> </ul>	3 - essay on scientist <ul style="list-style-type: none"> <li>• 1p style / spelling / grammar</li> <li>• 0.5p 200-300 words</li> <li>• 0.5p correct citation of sources</li> <li>• 2p description of scientist's research</li> <li>• 1p for CV details (e.g. when born, where educated, where currently)</li> </ul>	4 - paper summary <ul style="list-style-type: none"> <li>• 1p style / spelling / grammar</li> <li>• 0.5p 200-300 words</li> <li>• 0.5p correct citation of sources</li> <li>• 1p pointing out hypotheses tested</li> <li>• 1p describing how they are tested</li> <li>• 1p conclusion &amp; overall presentation</li> </ul>
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Class participation: it is very important for almost any career that you may be working toward that you can and do voice your opinion, ask questions, and communicate your knowledge in a group context. Therefore, (in every class) you should aim to participate in class discussions and have an active conversation with your teacher whenever you have the opportunity. If you do this, you will learn more from the class and acquire an important skill. You will also get (up to) 10 points in your grade.

Student presentation: this is your opportunity to focus on what *you* are really interested in. Start researching your topic early (at least 3 weeks before your talk). Feel free to show a draft of your slides to me or Emily or any classmates. Remember to both submit your PowerPoint file to d2l the day before your talk and to bring it to class. Double check that you have all pictures/video files along with it. If you get to the classroom early you can try out your talk on the classroom computer. Talks will be graded as follows:

- Topic 1 (interesting and appropriate to the class)
- Structure 2 (clear structure, main message/question, conclusion)
- Timing 1 (finished within 5 minutes of starting)
- Visual aids 3 (attractive, uncluttered slides that illustrate what you are saying)
- Content 4 (depth of understanding of your topic, detail presented)
- Presentation 3 (topic made interesting & clear to audience, presented audibly)
- References 1 (at least one original paper, correctly cited)

/15 points

### **Recommended books**

Krebs, J.R. and Davies, N.B. An introduction to behavioural ecology. 1993 (3<sup>rd</sup> ed.), Blackwell Science  
Wilson, E. O. Sociobiology. 1975 (new edition 2000), Harvard Univ. Press.

### **General issues**

#### **Students with Disabilities**

If you anticipate the need for reasonable accommodations to meet the requirements of this course, you must register with the Disability Resource Center and request that the DRC send me official notification of your accommodation needs as soon as possible. Please plan to meet with me by appointment or during office hours to discuss accommodations and how my course requirements and activities may impact your ability to fully participate.

### **Classroom Behavior**

From the Student Code of Conduct: “The educational process is ideally conducted in an environment that encourages reasoned discourse, intellectual honesty, openness to constructive change and respect for the rights of all individuals. Self discipline and a respect for the rights of others in the university community are necessary for the fulfillment of such goals.” Please review this section of the Student Code of Conduct at

<http://studpubs.web.arizona.edu/policies/studcofc.htm>

“The University seeks to promote a safe environment where students and employees may participate in the educational process without compromising their health, safety or welfare.” Please review the university’s Policy on Threatening Behavior by Students at

<http://policy.web.arizona.edu/~policy/threaten.shtml>.

### **Academic Integrity**

From the Student Code of Conduct: “Integrity is expected of every student in all academic work. The guiding principle of academic integrity is that a student's submitted work must be the student's own.” Please review this section of the Student Code of Conduct at

<http://studpubs.web.arizona.edu/policies/cacaint.htm>.

### **Absence Policies**

All holidays or special events observed by organized religions will be honored for those students who show affiliation with that particular religion. Absences pre-approved by the UA Dean of Students (or Dean's designee) will be honored. If you are absent without approval by the Dean, this may have negative effects on your grade.