ANTH 471H  
(also cross-listed as Schreyer Honor 401H)  
Honors courses are open to all serious undergraduate & graduate students

Biology, Evolution, & Society

Time and place
Wednesday evenings, 6:00 to 8:30 pm, Carpenter Building (Room to be announced)  
Class size limited to 20, to give ample opportunity for participation

Instructors  Office hours by appointment  
K.M. Weiss, Evan Pugh Professor of Anthropology and Genetics, 523 Carpenter Bldg,  
865.0989, kenweiss@psu.edu

Anne V. Buchanan, Senior Research Scientist, 515 Carpenter Bldg, 865.1586,  
annebuchanan@psu.edu

Course summary
The course will examine the modern conceptual basis of biology and how that is centered around  
evolution, with genes as its basis. We will look at the history of this view, and will identify the few  
simple principles upon which our understanding of evolution is based. We will see how these principles  
apply and what they account for over long time periods. At the same time, a new body of data on the  
genetic basis of the nature of organisms, over shorter time periods including those of development and  
response to the environment, has developed. These data reveal a series of new principles that are as  
simple as evolutionary theory, but have broader and often different implications, adding new dimensions  
to our understanding of the nature of life.

Modern evolutionary and genetic theory are very attractive to many people, so attractive that they have  
regularly been interpreted, extended, or applied to aspects of life and human society both within and  
outside of the life sciences themselves. Genes and evolution have become metaphors for much of life.  
They have been integrated into philosophy, social policy, and many other aspects of society. Even within  
the life sciences themselves, topics such as ancestry estimation, human variation, racial profiling in  
medicine, and individual health-risk prediction. Because evolution and genetics provide great depth of  
understanding and promise of practical applications in medicine and agriculture in ways such as these,  
they have important ethical and policy implications. These are quite controversial, but the most  
constructive way to understand the issues is to know both the underlying science as well as the various  
social and ethical concerns.

We will discuss these subjects, and will include an introductory foundation in genetics for those who  
aren’t sure of the basics. We will have reading and discussion on the nature of this new knowledge, and  
areas in which important questions remain in terms of how that knowledge is interpreted.
In past years, discussion in this course has regularly been extended into subjects of interest in the humanities, and in the way similar ideas apply to or must be consistent with fundamental issues even in the physical sciences.

**Prerequisites**
Formal prerequisites include ANTH 21, BIO 460, BIO 222, BIO 322, or BIO 230; 3 credits in statistics. If you feel you don’t have the right background, please contact us, as exceptions an be made.

**Course Format**
This 3-credit course will meet once a week. We will discuss the week’s topic and readings. Students will present material that relates to the reading, or its historical or scientific context, or material they find that is relevant. Depending on class size, we will have a term project, by individuals or groups. Students pick a relevant topic and present a mid-term report of progress, and follow that up with a term project in the form of a paper or some other form of presentation to the class at the end of the semester. With approval of the instructors, you can turn your subject into fiction or any other academically legitimate means of expression (one student wrote a full-length play, and we’ve had other original kinds of presentation).

As much as possible this will be an open forum that encourages thinking creatively or differently wherever possible, so long as we relate our discussions to the facts of biology as we understand them or the nature of knowledge in science, particularly life sciences. We encourage discussion to range as far and wide as the material justifies. This is not a course for those who just want to know what everybody else thinks, or give vent to their opinions, but for those who want to explore and think about these things for themselves, and be evidence-based. How strong is the evidence for various assertions that are made about genetics and evolution, and where is that evidence taking us? How and where is extension of these ideas to other areas of life and society justified?

We will take a turn for the different once or twice during the semester, typically reading a play or something of that sort that relates to the course topic.

This course is not for disengaged students; in addition to the paper, we assume attendance and active participation. You have to care enough to show up prepared! Biology, Evolution, & Society is offered by the Anthropology Department, but is cross-listed as a Schreyer Honors course because it has relevance to students in other disciplines. The course should be acceptable as part of curricular requirements for Biology, and satisfies distribution requirements in the Bioethics and Medical Humanities (BMH) Minor. Our objective is to examine the assumptions and reasoning in biology, concepts that apply to any other field of intellectual endeavor, including philosophy of science and knowledge, in which cogent thinking is important. There are no rigid course pre-requisites but we’ll assume a basic background in genetics, statistical reasoning, evolutionary biology or biological anthropology, and history or philosophy of science. Background deficiencies could be made up, for example, by summer reading.

*Contact us if you have doubts about this or any other questions about the course (kenweiss@psu.edu).*

**Grading**
1) Attendance, doing assigned work, and participation: **70%**
3) Term project in any format that meets our approval, including but not restricted to a paper, poster, play, fiction, and so forth, to be presented to the class at the end of the semester. Your choice of topic is equally free-ranging, as long as it’s relevant to the course. **However, if you are taking the class for BMH credit (the Bioethics minor) your project and other assignments must reflect Bioethics aspects.** Possible topics include a new finding in genetics that you’ve recently heard about, evolutionary ethics, exploration of the various sides of an ethical debate (e.g., genetic testing of newborns, behavioral genetics research, whether the benefits of sequencing the human genome can meet the promises, etc.), ways we make inferences about past events that can’t be directly observed, exploration of the extension of evolution into some specific area (e.g., business, literature, politics, world affairs, medicine, psychology, etc.), review of a relevant book looking at various sides of the argument, and so forth. Or, you could do something like read Darwin’s complete *Origin of Species*, or *Descent of Man* and discuss it with us biweekly as you read. **Discuss project topic and format with instructor; it must be approved by mid-September, which gets you started before too late in the semester—your final project is 30% of your total grade.**

**Course web site**
Course materials will be handled through Angel. Reading assignments will be posted weekly. **Check regularly for announcements, assignments, supplementary reading, class-related material or lecture outlines, and so on.**

**Something else of importance**
*Note that the information in the syllabus, including the class schedule below, is subject to change.* Changes will be announced in class and posted on the course web site.

We have to go through a few things that nobody likes to have to think about but that are important. We expect honesty and can’t pass students who violate standards of integrity. That means the usual PSU academic integrity policies ([http://www.psu.edu/ufs/policies/47-00.html#49-20](http://www.psu.edu/ufs/policies/47-00.html#49-20)) apply, and in particular that there is no plagiarism of work (using work from anybody else without appropriate citation). If you don't hold yourself to a high standard for honesty, don't sign up for this course.

**General policies of the University and this course**

**Disabilities:**
Penn State encourages qualified persons with disabilities to participate in its programs and activities. If you anticipate needing any type of accommodation in this course or have questions about physical access, please contact the instructor or the Penn State Office for Disability Services.

**Attendance:**
Attendance at class is important. The following are the acceptable reasons for missed assignments and exams:

- Illness with a doctor’s excuse (a Ritenour appointment card or telephone excuse are NOT acceptable),
- A University-sponsored event (with note from sponsor) or religious holiday recognized by PSU,
- A death or other emergency in the family (you must provide official documentation with a date): call the Assistance and Information Center ([http://cac.psu.edu/~elg8/ assist.html](http://cac.psu.edu/~elg8/ assist.html)) at 863-2020. They will take the information and notify the instructor of your absence.

**General statement**
Academic integrity is the pursuit of scholarly activity free from fraud and deception. This is an educational objective of Penn State and *all University policies regarding academic integrity apply to this course*. Academic dishonesty includes, but is not limited to, cheating, plagiarizing, fabricating of information or citations, facilitating acts of academic dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with the academic work of other students. At the instructors’ discretion, any instance of academic dishonesty will result in a failing grade, and may be pursued under the University regulations concerning academic integrity ([http://www.psu.edu/ufs/policies/47-00.html#49-20](http://www.psu.edu/ufs/policies/47-00.html#49-20)).
<table>
<thead>
<tr>
<th>Month</th>
<th>Tentative Weekly Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug</td>
<td>Introduction: The philosophy of inference. The basic questions to be answered</td>
</tr>
<tr>
<td>Sep</td>
<td>The origin of species in historical context</td>
</tr>
<tr>
<td>Sep</td>
<td>Genes and the nature of inheritance</td>
</tr>
<tr>
<td>Sep</td>
<td>The central importance of cooperation in life and evolution</td>
</tr>
<tr>
<td>Sep</td>
<td>The principles applied to specific ‘problems’ of life</td>
</tr>
<tr>
<td>Sep</td>
<td>Natural selection</td>
</tr>
<tr>
<td>Oct</td>
<td><strong>No class</strong>, but online submission of writing assignment</td>
</tr>
<tr>
<td>Oct</td>
<td>Genetic, evolutionary, and epidemiological inference. The importance of study design</td>
</tr>
<tr>
<td>Oct</td>
<td>The extension of Darwinian thinking to society, behavior, and political life: does it fit? Cooperation vs. competition: the ‘selfish gene’?</td>
</tr>
<tr>
<td>Oct</td>
<td><em>A Mid-semester Night’s Read</em>, <em>Doubt</em>, by JP Shanley</td>
</tr>
<tr>
<td>Oct</td>
<td>Evolution, religion, society: The Scopes trial and related materials</td>
</tr>
<tr>
<td>Nov</td>
<td>Race and society</td>
</tr>
<tr>
<td>Nov</td>
<td>Eugenics and the use of genetic information</td>
</tr>
<tr>
<td>Nov</td>
<td>Science and bioethics. Consumer genetics, 3d world testing</td>
</tr>
<tr>
<td>Nov</td>
<td><strong>Thanksgiving break, no class</strong></td>
</tr>
<tr>
<td>Dec</td>
<td>Student project presentations <em>(Extended class!)</em></td>
</tr>
<tr>
<td>Dec</td>
<td>Student project presentations <em>(Extended class!)</em></td>
</tr>
</tbody>
</table>