BIO370: Sensation and Behavioral Biology

Description

Biologists in the 21st century are (and will continue to become) increasingly interested in the phenomena of sensation and higher-order processes such as behavior. While these have been the subject of much study for centuries, modern molecular techniques have opened incredible opportunities for understanding at the most fundamental levels. This writing-intensive seminar will explore a variety of recent discoveries in these areas, with some emphasis on cellular and molecular discoveries; extensive student participation will be an absolute requirement of the course. This course fulfills the writing intensive requirement for the biology major.

Classes

Classes will be held in Room 301, PPHAC
Monday afternoons from 1 pm to 4 pm

Texts

Only one (new) book is required for this course, and should be available in the bookstore:

A Short Guide to Writing About Biology, 5th edition by Jan A. Pechenik

You will also want to have a good style book, such as The Bedford Handbook (whatever edition you have from WRIT100)

Human cells make their own morphine -- who knew?

The cover of the September issue of The American Biology Teacher features a lovely picture of a mushroom. The "About the Cover" blurb reads:

With its brightly colored, sometimes plate-sized cap, fly agaric (Amanita muscaria) is one of the most striking of all mushrooms. They are commonly found in conifer forests throughout the northern hemisphere. The color is
highly variable, and includes bright reds, oranges, and yellows, but there are always white patches on the cap (remnants of a veil that covered the button stage). These fungi are considered good luck in many parts of Europe, where they can often be found hanging next to four-leaf clovers. (Fly agaric earned its reputation for luck, as well as its name, because it can be placed in milk to attract flies. The flies hallucinate, crash into walls, and die.) The fungi are well known for their hallucinogenic (and sometimes poisonous) properties. They also act on the nervous system as neuropeptide receptors, suppressing the neurons that transmit fear; the Vikings gained their reputation for fierceness by eating *Amanita muscaria* prior to invasions. Minute amounts of the fungus are also used medicinally to treat pain, arthritis, and cancer.

Man, is biology cool or what?

Some more ideas:

- Pain: how does it work? There was a relevant article in the July 7th issue of *Science*, on p. 326.
- *The Chronicle of Higher Education* has an interesting article on pheromones in its August 4th issue.
- The August 27 issue of *Science* has an article on the normal pathway of degradation of α-synuclein and its relevance to Parkinson’s disease.
- The five classic sensory systems: touch, taste, smell, hearing, and vision
- Balance
- Synesthesia
- Learning
- Memory
- Courtship and mating
- Sleep
- Aggression
- Addiction
- Altruism
- Biological clocks
- Hallucinations
- Emotions
- Sexual orientation
- and of course, the Big Kahuna: Consciousness
Course Objectives

Upon successful completion of this course, students will be able to:

- select and research specific topics in the areas of sensation and behavioral biology using both primary and secondary literature sources
- concisely describe a body of research in abstract form
- construct written outlines and drafts based on feedback from peers and the professor
- write research review papers in a proper scientific format
- give concise, well-organized oral presentations to peers
- clearly discuss and answer questions from their peers about their research findings
- offer valuable, constructive criticism on peers' written and oral work

Course Policies

Attendance

I expect that you will make every effort to attend each class session. We have very little time together, and much of it will be spent helping each other, so when you miss a class you've denied some of your classmates a chance to learn.

That said, I understand that sometimes things intervene and make absences unavoidable. Over the course of the semester you can miss one draft-editing session and two presentations (not your own, obviously!) without penalty, provided you have a good reason for missing class. Serious illness is pretty much a minimum for "good" here, and any rescheduling of a missed presentation is entirely at my discretion. If you must miss a class, please let me know in advance if at all possible. It's a question of respect, both for me and for your fellow students.

Grading

Here is how I will weight the several components of the course:
Here is the grading scale I use in all my classes:

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<thead>
<tr>
<th>numeric grade</th>
<th>letter grade</th>
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<tbody>
<tr>
<td>93.3 - 100</td>
<td>A</td>
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<tr>
<td>90.0 - 93.2</td>
<td>A-</td>
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<td>86.7 - 89.9</td>
<td>B+</td>
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<tr>
<td>83.3 - 86.6</td>
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<td>80.0 - 83.2</td>
<td>B-</td>
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<td>76.7 - 79.9</td>
<td>C+</td>
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<td>73.3 - 76.6</td>
<td>C</td>
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<td>70.0 - 73.2</td>
<td>C-</td>
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<td>66.7 - 69.9</td>
<td>D+</td>
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<td>63.3 - 66.6</td>
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<td>60.0 - 63.2</td>
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Just to review, this is what the Student Handbook has to say about grades:

A and A-
These grades are given for achievement of the highest caliber. They reflect independent work, original thinking, and the ability to acquire and effectively use knowledge.

B+, B, and B-
These grades are given for higher than average achievement. Evidence of independent work and original thinking is expected.

C+, C, and C-
These grades are given when the student has devoted a reasonable amount of time, effort, and attention to the work of the course and has satisfied the following criteria: familiarity with the content of the course, familiarity with the methods of study of the course, and active participation in the work of the class.

D+, D, and D-
These grades are given for unsatisfactory work, below the standard expected by the College. They indicate work which in one or more important aspects falls below the average expected of students for graduation. The work is, however, sufficient to be credited for graduation, if balanced by superior work in other courses.

Late Assignments

Late assignments are very bad. We're on a tight schedule, and you need to stay on top of the assignments. Anything you hand in late disrupts my schedule as well as the schedules of your classmates. Late assignments will be penalized 10% of the full value for each day (or fraction thereof) that they are late. This also applies to assignments that simply aren't up to snuff: if you hand in two hand-scrawled pages and expect that to count as a draft, you are going to be disappointed!

Reading

It is important that you do the reading assigned for any given session (see the Syllabus) in advance. Discussion of the material is a critical part of the course, and if you haven't read that day's material, you're depriving yourself and your classmates of your most informed and considered opinion.

Studying Together

Working together is a Good Thing. I encourage you to talk with friends in and out of this course about what you're doing, how effective your writing is, whether the approach you've chosen to take makes sense, whatever.
There is no aspect of this course that can't be improved by working with other students on it.

**Academic Honesty**

I adhere to the Academic Honesty policy of the College. There is nothing more important to me than personal integrity - not money, not power, not even Science - and I conduct myself and all of my classes in that spirit. If you're not familiar with College policy, you should be.

**Papers**

Each draft you hand in must clearly indicate what it is: Who wrote it, when you wrote it, which assignment it is, which draft it is. Be sure to also indicate the word count (see below). All drafts must be typed or word-processed, unless you speak to me first.

In accordance with College policy, note that it is your responsibility to keep all materials (notes, jottings, index cards, intermediate drafts, etc.) for all assignments in this course until you receive a final grade. It is especially important that those of you writing with a word-processor be sure to save intermediate drafts as separate documents!

- There will be two major writing assignments in this course:
  1. Review. We'll review (heh.) the structure of a scientific review article on Thursday, September 1, but in short they synthesize a number of papers in a particular area into a coherent and fluid whole. The author may choose to extend the content beyond what is known by adding his or her own speculations, but this isn't a requirement.

I want to see a minimum of 10 primary sources used for this paper. (The notion of a peer-reviewed journal is absolutely critical: be certain you understand what is meant by this term!)
2. Research Proposal. Scientific research costs money, and oddly enough, people with money almost always need to be convinced to give some to you. Knowing how to write a solid, interesting, effective research proposal is a critical skill in modern science. We'll look at this kind of writing later in the semester.

- The two papers must be on separate topics, unless you have double the minimum number of references. I intend the two presentations to be keyed to these papers, so if you do use the same topic for both papers, you're going to have to choose a different topic for one of the talks.
- I expect a certain minimum length for each draft:

<table>
<thead>
<tr>
<th>Draft</th>
<th>Minimum length</th>
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<tbody>
<tr>
<td>First</td>
<td>2000 words</td>
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<td>Second</td>
<td>2400 words</td>
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<td>Third</td>
<td>2700 words</td>
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<tr>
<td>Final</td>
<td>3000 words</td>
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And don't forget to consider using the Writing Center -- getting a real outsider's perspective (by which I mean a non-scientist, or one who isn't very familiar with your subject) can be an invaluable asset to your writing.

**Presentations**

Each of you will give two oral presentations over the course of the semester. You will also be responsible for evaluating the presentations of your classmates. We'll discuss and develop criteria for evaluating these presentations late in September, but here are a few ground rules:

- Your presentation should take between 20 and 25 minutes, to allow for questions
- You must provide me an abstract (200 words or more) and the citation information for a single relevant paper **one week before** your first presentation; I will post this information on the website. If the paper isn't freely available to your classmates, you must also put a copy on reserve in Reeves. For the second presentation (the research proposal), only the abstract is necessary.
• For at least one presentation you must use a software presentation program such as [gak!] PowerPoint.
• In at least one presentation you must present experimental results (from one of the papers, of course -- I don't expect you to create them!) in reasonable detail.

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<thead>
<tr>
<th>Date</th>
<th>Speaker</th>
<th>Abstract</th>
<th>Reference</th>
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**Participation**

Beyond your written and oral presentations, I also expect you all to participate in editing your classmates' written drafts and evaluating their presentations. You can see by the point distribution I use for grading that I take these aspects of the course very seriously.

When editing, keep in mind the purpose and audience of the piece. We'll discuss our goals and criteria further in class, but as is so often the case, the golden rule is a pretty good guide.

Similarly, we'll develop criteria in class to help evaluate presentations, but it's important to read the abstracts and papers prior to the presentations. Learning how to efficiently extract the gist of a paper is an extremely valuable skill, and one which I hope this course strengthens.

In addition, I expect you to give me evaluations of each talk. We'll discuss the format later in the semester.