

EEB 409 Perspectives in Ecology and Evolution Spring 2010

Instructor: Dr. Brian C. O'Meara

Office hrs: TBD

Meeting time: 9:40 -10:55 AM Tues & Thurs (1.25 hr/class). 427 Hesler Biology

Catalogue description:

Forefront considerations of ecology, behavior, and evolutionary biology. Emphasis on current developments for applications, including societal and economic impacts and moral and ethical implications. An oral presentation and a referenced library-research essay are required. Writing Emphasis course.

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This course has different topics each time it is run. This semester's topic is "Phylogenies and...". Phylogenies are depictions of evolutionary relationships: one species becomes two, one of those then splits into two, and so forth, creating an evolutionary tree. These trees have many applications. Though phylogenies are most relevant in evolutionary biology, they are used in everything from conservation to criminal cases.

You will need some background knowledge to understand the papers we will be discussing. This will be presented before each paper. The goal of the course is learning "tree thinking", not the gritty details of phylogenetics, but you will need to have a sense of what terms mean and similar information.

About half the class time is devoted to discussions of papers, indicating its importance. Discussion of the literature is a good way to learn about how people practice science and it is an important part of the class. These papers will be available through the online course site. **Be prepared for the discussions.** I would suggest reading each paper at least twice. Focus first on the abstract, introduction, and discussion, think about what this means, then read it again, including the methods and results. Discussion forms a component of the grade.

There is room in the schedule for three topics to be chosen after consultation with students on their particular areas of interest (if the class is mostly interested in medical issues, for example, we could go more in depth on articles about how phylogenies apply in that area). There will be some tuning of readings once the class begins (depth of reading will depend on overall class skills and background).

Writing is another important component of the class (and is the main focus of grading). Writing assignments will take a variety of forms to keep them interesting and to help prepare you for future work. You should be careful to cite papers and other sources. EndNote (available from OIT), Zotero (free FireFox extension), BibTeX, and other software applications may help with this. Almost all your references should be to peer-reviewed publications.

Writing and presentations will be graded on a variety of levels, such as grammar, structure, and substance. The purpose of grading and comments is to improve your writing. Remember that your writing is being graded, not you.

Word count sets a minimum length (and references are not counted) but you may go a bit longer if needed (try to keep below 125% of required length). Since length is judged by words, not page length, please don't do any odd formatting of your paper (huge or tiny margins, font sizes of 8 or 18, etc.) to try to meet some page limits.

Papers will be turned in via Online@UT. This eliminates issues with printers, odd file formats, and the like. The site will automatically check your work for possible plagiarism. I do this in all my classes with written work. Except where noted, assignments are to be done individually. When in doubt about citation, plagiarism, or collaboration, **ASK**. For help with submitting documents online, see <http://online.utk.edu/students/assignment.shtml>. There is a practice uploading assignment that will allow you to test to make sure you can upload files correctly before the pressure of a deadline.

Communication is very important. I have set up a forum on the BlackBoard site (Online@UT) for our course. If you post a question there, I will immediately be emailed about it and will respond on the forum (though perhaps not immediately). Emailing me directly will not be any faster (though do email me if the issue is better addressed one-on-one). The benefit of using the forum is that everyone can see the answers and there's a chance that one of the other students will answer the question first. Feel free to use the forum for other class-related discussions.

Many classes start with microquiz, consisting of a few short questions, regarding the material assigned and/or previous material covered. This is an additional incentive to do the reading and review what we previously studied. The lowest two scores are dropped.

Attendance is expected at all classes, though missing a class or two due to illness, family problem, etc. might happen (and is strongly suggested in the case of flu: <http://safety.utk.edu/flu/>). Make up of microquizzes is normally not available (lowest two grades are dropped).

Late work is penalized at 10%/day (so something turned in 49 hours late is given a score 70% of what it would have received on the due date). Extensions are not normally granted, except under extraordinary circumstances (having too much work to do does not qualify, for example).

Any student who feels s/he may need an accommodation based on the impact of a disability should contact me privately to discuss specific needs. Please contact the Office of Disability Services at 865-974-6087 in Dunford Hall to coordinate reasonable accommodations for students with documented disabilities.

All relevant University policies (including, but not limited to, policies on academic integrity, attendance, etc.) apply to this course. In the case of any conflict between the policies in this syllabus and University policy, University policy applies. The instructor reserves the right to revise, alter, and/or amend this syllabus as necessary. Students will

be notified in writing and/or by email of any such revisions, alterations, and/or amendments.

## **Schedule**

Week 1: Jan. 14 (Th)

In class knowledge baseline evaluation.  
Overview of course.  
Intro to trees and phylogenetic diversity.

Week 2: Jan. 19. Discussion of phylogenies and conservation paper (Faith 1992)

Week 2: Jan. 21. Estimating confidence

Week 3: Jan. 26. Discussion of HIV paper (Ou et al. 1992; Palca 1992 gives background)

Week 3: Jan. 28. Dispersal

Week 4: Feb. 2. Discussion of human dispersal paper.

**Week 4: Feb. 3, 5:00 pm: DUE: 300 word essay on non-phylogenetic approach.**

Week 4: Feb. 4. Ancestral state reconstruction

Week 5: Feb. 9. Discussion of frog call reconstruction paper (Ryan and Rand 1995)

Week 5: Feb. 11. Branch length estimation

Week 6: Feb. 16. Discussion of vaccine evolution paper.

Week 6: Feb. 18. Messy tree-like processes (hybridization, etc.)

Week 7: Feb. 23. Discussion of language evolution paper.

**Week 7: Feb. 24, 5:00 pm: DUE: NSF mock proposal.**

Week 7: Feb. 25. Trait evolution 2: Comparative methods

Week 8: Mar. 2. Discussion of evolution of sleep/parasites

Week 8: Mar. 4. Surprises about relationships

<spring break March 8-12>

Week 9: Mar. **16** Review of material in class. *[note change of date from Mar. 15]*

Week 9: Mar. **18** Open midterm in class. *[note change of date from Mar. 17]*

Week 10: Mar. 23. Discussion of whippo paper.

Week 10: Mar. 25. Niche models

Week 11: Mar. 30. Discussion of climate niche modeling paper

Week 11: Apr. 1. Intro to free topic 1 (species delimitation, amino acid evolution, etc.)

**Week 12: Apr. 6: Oral presentations**

**Week 12: Apr. 8: Oral presentations**

Week 13: Apr. 13. Discussion of free topic 1

Week 13: Apr. 15. Intro to free topic 2

Week 14: Apr. 20. Discussion of free topic 2

Week 14: Apr. 22. Intro to free topic 3

Week 15: Apr. 27. Discussion of free topic 3

**Week 15: Apr. 28, 5:00 pm. DUE: 2000 word essay**

Week 15: Apr. 29. Last class! Wrap up discussion/lecture.

## **Projects:**

50 words each: Microquizzes (once per week, 12 active weeks, for 600 words). Lowest two grades dropped. 5 points each.

600 word critique of article (student choice, last week prohibited). **Due at 5:00 pm one week after in-class discussion of article.** 60 points. **DO NOT FORGET THIS! IT IS NOT ON THE SCHEDULE, AS YOU CHOOSE WHEN TO DO IT.**

300 word essay: describe a non-phylogenetic approach which would have addressed the main question of the article OR explain why such a method may not exist. Choose between any of the articles discussed at this point. 30 points.

1000 words. Mock NSF proposal for using phylogenies. Include references. 100 points.

600 words. Open book midterm: a test based on three of the articles read so far (student choice). Students answer questions based on this (the questions are general enough to apply to any of the articles). Notes allowed, computers not (except in cases of documented disabilities requiring their use). 60 points.

Oral: Talk to lay audience on one of the papers covered in the course, or another paper in this domain (subject to approval). Pair project. 50 points.

2000 word essay: review article on topic of interest, complete with references to the literature. 200 points.

Discussion in class: 200 points.