Syllabus – Evolutionary Pathways in Nature

SPRING 2011
BIOL. 517T SECTION 2 # 19252
Thursday nights 6 p.m. to 8:50 p.m.
ROOM MH 217

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Office Hrs.: TBA

Primary Course Website: http://biology.fullerton.edu/biol517dje
Course Schedule: http://biology.fullerton.edu/biol517dje/schedule.html
Blackboard Website: Access available once logged in to Student Portal

Prerequisites – Graduate-level standing in Biology or related disciplines. Advanced undergraduate students must obtain permission from the Instructor before enrolling.

Overview - This seminar course will be organized around student-led discussion of a recent book by Dr. John Avise from UC Irvine together with the primary literature articles behind the examples in his book. The premise is that a phylogenetic approach, often employing recent robust evolutionary tree estimates based on molecular sequence data, can serve as historical backdrop for a more effective analysis of organismal evolution and ecology, including the interpretation of traits such as anatomy, coloration, reproductive lifestyles, behavior, ecology, and geographic distributions.
[Amazon.com Link](https://www.amazon.com) (includes “Look Inside” table of contents preview).

Course Organization - The course will be organized as follows into four phases:

1. Introduction to interpreting phylogenies, and inferences about the evolution of particular traits of organisms given a particular phylogenetic hypothesis (Led by instructor and participating guest faculty, weeks 1-3)

2. Investigation of particular chapters in the text and research articles from the primary literature related to the examples in these chapters (Led by enrolled students, weeks 4-15)

The first five sessions will be devoted to an overview of basic concepts in phylogenetic analysis and the optimization of character evolution on phylogenetic hypotheses. Specific readings will be assigned for these introductory sessions, and these will be posted to the “Course Documents” section of the Course website, or else distributed as photocopies the week before they will be covered.

Weekly Written Synopses – Starting with week 2 and ending with week 13, you will be expected to read the weekly assigned text chapter(s) and article(s) and write a synopsis and discussion of the main points, to be turned in at the start of the class when the article(s) will be discussed. The format you choose in your write-up is up to you. The score you receive for each synopsis write-up will be based on the following rubric (20 points possible):

1) Do you provide an accurate overview of the main points from the assigned reading, including discussion of alternative hypotheses that are addressed, the source of new data analyzed, results obtained, and discussion of their implications? Do you appropriately cite the article? Do you provide a concise and original synopsis of the important conclusions avoiding merely quoting long portions of the assigned reading? (8 points)

2) Do you build on the previous readings and seminar discussions, for example, do you address questions raised in either the assigned reading or in seminar discussion? (3 points)

3) Do you offer a critical analysis of the significance of this article relative to previous studies, for example, those cited by the author(s)? Is the research article(s), as introduced by one or more assigned text chapters, effective in adding new insight into the interpretation of an evolutionary pathway? Are previous interpretations contradicted and, if so, are the new hypotheses or evidence compelling in providing a more general explanation for the pattern or does it more likely apply only to the specific case investigated? Do you appropriately use citations for ideas that come from other people? Do you summarize the important conclusions of previous articles in your own words rather than quoting? (3 points)
4) Do you present your own ideas or questions and allow them to be considered in light of the current evidence, and do you consider alternative ideas? Do you recognize naïve ideas and relinquish or refine them after considering evidence? (3 points)

5) Is your writing clear and free of mechanical errors (complete sentences, well organized, grammatically correct, legible, and free of spelling errors)? (3 points)

Note: Papers will not be accepted after the start of class (6:00 p.m.) without a legitimate medical excuse. The reason for this policy is to ensure that you will come to the scheduled course meeting time ready to discuss the assigned reading.

Student-led Discussions - Starting with the fourth week, the weekly discussions will be led by one or two enrolled students. After an overview first chapter emphasizing phylogenetic principles, the rest of the text is organized into chapters devoted to a them (e.g., Anatomical structures and morphologies, Body colorations, etc.) and then further subdivided into approximately 10 diverse examples. We will alternate between reading all the examples in a chapter, with one or more students assigned to lead a mini-discussion on a particular example, and a second week, where one or two examples will be considered in much more thorough detail, based on collective reading of primary literature related to the briefly summarized example. As many very brief. If you choose to share your leadership role with another student then you will each be expected to lead a second week, preferably each with different partner for the second session. A corresponding list of articles from the primary literature that correspond to the brief chapters in the book will be posted to Blackboard by the third week of class. You will be expected to choose one of these (or two if you choose to share the leadership duties) and email your choice(s) to Prof. Eernisse at deernisse@fullerton.edu (generally, first come, first served). If no email is received by about Week 3, a reading will be assigned. Feel free to suggest an alternative article if you have one that has general implications for Baja phylogeography. The schedule of your presentation(s) will be assigned, depending on when it best fits with the sequence of topics to be covered, and the schedule of selected articles will be posted to the course website. PDF versions of the articles or supplementary material will likely be made available for downloading through the course Blackboard site only, under the “Course Documents” section. In contrast to previous semesters, students enrolled in this course will be automatically enrolled in the Blackboard course website, accessible by clicking on the “Blackboard” tab once you have logged into your Student Portal (http://www.fullerton.edu). Besides the article assigned as the presentor, you are encouraged to pursue supplementary supporting materials on your own. Such supplementary material might include in-person or on-line library research (e.g., Web of Science, Biosis), references provided on the course website listing of references, clarifying sections of textbooks, or on-line supporting course web pages that you find with the help of a Web search engine (e.g., google.com).

All students other than presentors will be expected to not only carefully read the assigned articles and supporting material to be covered for a particular week before coming to class, but will also be expected to submit at the beginning of each class a concise thoughtful written synopsis of each weekly reading assignment (see “Weekly Written Synopses” section above). The instructor will read and provide a numeric score on each
of your write-ups, and these points will constitute the primary component for assessing
the performance of the student in the class. Expect that papers might take a week or more
to be returned to you. You will also be evaluated on the quality of your presentation and
for the leadership qualities that you exhibit, including your efforts to involve other
students in the discussion.

Assessment:

Grades will be based on the following estimated point totals:

- Exercises (2 at 10 points each) 20 points
- Weekly write-ups (12 at 20 points each, none due the first week) 240 points
- Attendance and participation (up to 10 points per week) 140 points
- Leading one or more assigned discussions (total points possible) 100 points

**Total estimated points** 400 points

Your final grade in the course will be based on the percentage of the total accumulated
according to the scale depicted below. Under unusual circumstances, the instructor might
adjust scores of individual graded assignments in your favor, but do not anticipate
otherwise curving the final scores.

<table>
<thead>
<tr>
<th>% Score</th>
<th>Grade</th>
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<tbody>
<tr>
<td>85 – 100</td>
<td>A</td>
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<td>75 – 84</td>
<td>B</td>
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<td>65 – 74</td>
<td>C</td>
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<tr>
<td>55 – 64</td>
<td>D</td>
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<tr>
<td>54 BELOW</td>
<td>F</td>
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Adds/Drops:

Important dates concerning registration or drops are posted at:
http://myweb.fullerton.edu/AcademicCalendar/Default.aspx

Extra Credit:

You can submit up to two “extra” book reviews for up to 15 points each extra credit (see
above). There will also be an opportunity to earn extra credit points for attending primary
research seminars related to some aspect of phylogenetics or evolutionary analysis. You
can earn extra credit for attending up to two seminars, and you can earn up to 10 points
per seminar (20 points maximum). Selected seminars from the Spring 2011 Biology
Seminar Series that are deemed appropriate will be announced in class, but ask if you
would like to attend one that has not been announced but seems appropriate to you. The
Departmental Seminar schedule is at: http://biology.fullerton.edu/events/ and are held
each Wednesday at 4 p.m., MH513. If you find another scheduled seminar elsewhere or
an alternative activity that you feel will enhance your understanding of the course topics,
email or otherwise provide me with details in advance of the potential activity, or take a
chance and do it and I may or may not approve it. In general, I will want you to provide a
written account, organized as you choose to do, in an effective manner. I will expect you to relate the seminar to topics we have covered in our course, or related topics if you can make a compelling case that the topic is related. I will assign 0-10 points per seminar attended, depending on the quality of your write-up. Note that the write-up must be thoughtful and carefully reasoned and written at a graduate level in order to get the full number of points available. A brief general write-up will not get full credit.

**Make-up Policy:**

Due to the nature of the course, it will be difficult to make up missed course meetings. If you miss a week of the course, I will consider prorating your other attendance scores ONLY when arrangements are made prior to the course meeting time, and you have a legitimate excuse for missing class. Documentation is required. Contact me about whether I will penalize your submission of a weekly write-up if it must be late and you have a valid excuse. This is your responsibility, and failure to follow the above guidelines could result in a zero grade for the assignment or a deduction for late submission in less severe cases. Generally, late submissions for weekly write-ups will be assessed a late penalty of at least 25 percent minimum for one day late and an additional 10 percent of any portion of every other day it is late. I might elect to waive these penalties, depending on the circumstances that caused you to miss class, or not turn in a weekly write-up.

**Rules About Withdrawing from Courses:**

CSUF has a policy (UPS 300.016) regarding withdrawal from classes. After the first census date, students may be granted withdrawal only by presentation of documentation outlining a physical, medical or emotional condition that prevents completion of the course. Poor academic performance is not evidence of a serious reason for withdrawal. Students unable to produce official documentation will be required to take the grade they have earned in the class.

**Academic Dishonesty Policy:**

Although you will be conducting several group-oriented discussion activities, each assigned weekly write-up must be completed individually, and the work must be your own. Use online or library sources of information, always properly cited, and work together often. However, your weekly write-ups must reflect your own independent thinking. When you use information from sources external to yourself, you need to reference the source appropriately (literature citation, URL for web-derived material). Just because you referenced a source does not give you the right to insert segments, verbatim, into papers you write or drawings you produce in your lab notebook. Cheating will not be tolerated and could result in both a failing grade in the course and formal reporting to the CSUF academic administration.

Biology 517T – Spring 2011 - Tentative Schedule by Week
<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Assignment*</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Course Organization/Introduction</td>
<td>None</td>
</tr>
<tr>
<td>2</td>
<td>Phylogenetic Concepts</td>
<td>EPIN Ch. 1</td>
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<tr>
<td>3</td>
<td>Mapping Characters on Phylogenies</td>
<td>EPIN Appendix</td>
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<tr>
<td>4</td>
<td>Anatomical structures and morphologies</td>
<td>EPIN Ch. 2</td>
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<tr>
<td>5</td>
<td>Student-led discussion</td>
<td>Primary Lit. TBA</td>
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<tr>
<td>6</td>
<td>Body colorations</td>
<td>EPIN Ch. 3</td>
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<tr>
<td>7</td>
<td>Student-led discussion</td>
<td>Primary Lit. TBA</td>
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<tr>
<td>8</td>
<td>Sexual features and reproductive lifestyles</td>
<td>EPIN Ch. 4</td>
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<td>9</td>
<td>Student-led discussion</td>
<td>Primary Lit. TBA</td>
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<tr>
<td>10</td>
<td>More behaviors and ecologies</td>
<td>EPIN Ch. 5</td>
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<tr>
<td>11</td>
<td>Student-led discussion</td>
<td>Primary Lit. TBA</td>
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<tr>
<td>12</td>
<td>Cellular, physiological, and genetic traits</td>
<td>EPIN Ch. 6</td>
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<tr>
<td>13</td>
<td>Student-led discussion</td>
<td>Primary Lit. TBA</td>
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<tr>
<td>14</td>
<td>Geographical distributions</td>
<td>EPIN Ch. 7</td>
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<tr>
<td>15</td>
<td>Student-led discussion</td>
<td>Primary Lit. TBA</td>
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