Biology 218, Evolution

“Nothing in biology makes sense except in the light of evolution.”
Theodosius Dobzhasky

Instructor: Dr. Leslee Parr
555 Duncan Hall
Office hours: Mon. 3:30 – 4:30 p.m. and Thurs. 3:30 – 5:30 p.m.
Phone: 924-4897
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Required Text:
• Evolutionary Analysis. Third Edition*. Scott Freeman and Jon Herron.
  Prentice Hall.
*Please note that the Second Edition will not be acceptable.

(‘Beat the Bookstore’ located between Togo’s and the Post Office at 110 Paseo de San
Antonio has ordered used texts specifically for our class, please patronize them for the
best prices)

Suggested supplemental text (NOT REQUIRED):
• Evolutionary Biology. Third Edition. Douglas Futuyma

Course Prerequisites:
• Graduate standing.
• Biology 118 and Biology 202 or equivalent strongly recommended.

Course Description: The goal of this course is to introduce you to the large body of
science that is encompassed by evolutionary biology. Darwin’s theory of biological
evolution is one of the most revolutionary ideas in Western thought. When Darwin put
forth his theory of evolution in 1859 it profoundly challenged the prevailing view that the
world was static and perfectly created. According to Darwin’s theory, evolution is
defined as descent with modification. Today we most often use a broader definition; we
say that biological evolution is change in the properties of populations of organisms or
groups of such populations over the course of generations.

Of all the biological sciences, evolutionary biology is the most sweeping and
comprehensive. Evolutionary biology gives meaning to the great themes of biology,
including the history of life on earth, the existence of the incredible diversity of life, and
the processes that govern molecular biology. Evolutionary thinking also gives insight
into the hard-to-explain characteristics of life, such as the existence of gender and sex,
of altruism and social structure and the co-adaptation of pathogens and hosts.

Evolutionary theory is the only theory that can seriously claim to unify biology.
Among the most attractive aspects of evolutionary thought, is that it is rooted in a single,
organizing mechanism. This mechanism is natural selection. Natural selection is the
agent of evolutionary change. Evolution by natural selection can be scientifically tested;
it is one of the most powerful ideas in all of biology.
**COURSE DEMANDS:** This is a demanding course. As a student enrolled in this course, it is expected that you will devote a large amount of time to reading and comprehending the required readings. You will be expected to come to class each week prepared to contribute to a discussion with your instructor and your classmates about the assigned topic.

**Much of your grade is based on:**
- your participation in class,
- your comprehension of the reading materials,
- your ability to express opinions and applications of the concepts covered in these readings in both an oral and written format.

Please plan to spend at least three to five hours outside of class each week of this semester reading and understanding the assigned materials. If you do not have this kind of time to devote, please do not attempt this course, it will not be fair to yourself, to your classmates, to your instructor, or to those waiting to enroll in this class!

Being talented at memorizing many facts and details will NOT help you in this class. Being brave enough to express opinions and ask meaningful questions out-loud and being able to express yourself well and concisely WILL help you earn a good grade. If you have trouble writing or with speaking up, I suggest you take Biology 202 before you take this course.

**INSTRUCTOR’S GOALS:**
1) Expose SJSU Biological Sciences Graduate students to the large body of science that is encompassed by evolutionary biology.
2) Increase SJSU Biological Sciences Graduate students’ skills in ways that will make them more successful professionals. Once you complete this course you will be able to:
   - conduct literature research.
   - comprehend complex concepts.
   - write intelligently and broadly on the topic of evolution.
   - Effectively, communicate, both orally and in the written word with public, peers, and experts in regards to the sub-disciplines included in the study of evolution.
   - Participate in the community and culture of science.

**Literature review and Effective oral & written communication:**
You will be expected to speak and contribute to class discussions each and every week. This demands that you not only read the assigned material, but that you also research the primary literature on the topic. On one occasion you will need to present a review of some of this literature (at least one article) to your classmates. At this time you will also need to turn in both a photocopy of the author’s abstract and an abstract in your own words of this paper to the instructor. On a second occasion, you will need to select a chapter from your chosen book to provide for your classmates to read, you should be prepared to lead the discussion on this chapter.

You will also be asked to read one ‘popular’ book related to Evolutionary Biology. You will present an oral and written review of this book on either May 3 or 10.
- 3 X 25 pts. = 75 points

**Final Literature review** You will be required to prepare and submit a literature review of no less than 5, double-spaced, word-processed pages (10 or 11 point font). The paper
must be properly referenced and must reference at least five, peer-reviewed papers. Topics can be on any subject in evolutionary biology, however any topic must be approved with instructor consent. I suggest you choose a topic related to your Master's research or of special interest to you. On March 8, you will need to hand in to me a proposed concept outline of your planned paper, including abstracts (written by you) of three of the papers you intend to use (you will need to include the title page and author prepared abstract of those papers). I will give you feedback on your paper. The final version of the paper is due to me on Wed., May 10.

- 50 pts.

**Reading comprehension and Effective writing:**
Each week of class you will be giving an in-class writing assignment during the first 15 minutes of the class session. The writing will be based on the readings assigned for that week. Each paper that you turn in will receive 5 pts. (good effort), 2 pts. (fair effort) or 0 pts. (not in class/ no effort). Once in every three-week rotation (five times during the semester) you will indicate to me that you wish the paper to be thoroughly reviewed/ graded (20 pts. possible).

- 10 X 5 pt. writings = 50 pts.
- 5 X 20 pt. writings = 100 pts.

**Effective oral communication:**
Between March 8 and April 26, student groups will give group presentations covering background material, key concepts and related, current literature on the assigned topics. Grades for these presentations will result from a combined score consisting of the instructor’s grade averaged with the class peer’s average grade.

Each student will participate in one round of presentations.
- 50 points

**Participation in the community and culture of science:**
You will be required to attend at least one SJSU Department of Biological Sciences seminar (they take place on Wednesdays at 1:30, seminar schedule provided) and at least one outside seminar (for example Moss Landing Marine Laboratories seminar series, Bay Area Biosystematists monthly meeting). After each seminar you are required to provide the instructor a written summary of the talk and a copy of an author’s paper related to the talk. Your summary should include how the talk is related to topics covered in this course. You should also plan to work your experience into class discussions.

2 X 50 = 100 points

**Grades will be assigned as follows:**
- 100 - 90% possible points = A
- 89 - 80% possible points = B
- 79 - 70% possible points = C
- 69 - 60% possible points = D
- 59 - 0% possible points = F

**Drops:** University and department guidelines require a serious and compelling reason to drop a course after the February 8, 2006 drop date. Grades alone do not constitute a reason to drop a course.
# Class Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Text</th>
<th>Video/ Activity</th>
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<tbody>
<tr>
<td>1/25</td>
<td>Introduction</td>
<td></td>
<td>v-Darwin-1</td>
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<tr>
<td>2/01</td>
<td>Introduction to Evolutionary Theory</td>
<td>Ch. 1 &amp; 2</td>
<td>v-Darwin-2</td>
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<tr>
<td>2/08</td>
<td>History of Evolutionary Biology</td>
<td>Ch. 3</td>
<td>v-Darwin-3</td>
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<tr>
<td>2/15</td>
<td>What is a Species?</td>
<td>Ch. 15</td>
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<tr>
<td>2/22</td>
<td>Speciation</td>
<td>Ch. 15</td>
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<tr>
<td>3/01</td>
<td>Phylogenies &amp; Evolutionary Trees</td>
<td>Ch. 14</td>
<td>v-Great Transformations</td>
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<tr>
<td>3/08</td>
<td>Sexual selection</td>
<td>Ch. 7 &amp; 10</td>
<td>Grp. Present &amp; v-Why Sex?</td>
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<td>3/08</td>
<td>Review Paper Outline &amp; 1st Draft,</td>
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<td>plausible Scenario, Narwhal’s Tusk’</td>
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<tr>
<td>3/15</td>
<td>Kin Selection &amp; Social Behavior</td>
<td>Ch. 11 &amp; 12</td>
<td>Group Presentation</td>
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<td>3/22</td>
<td>The Origins of Life</td>
<td>Ch. 16</td>
<td>Guest: Dr. Berstein, NASA</td>
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<td>3/29</td>
<td>Spring Break – no class</td>
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<td>4/05</td>
<td>Fossil Record &amp; History of life</td>
<td>Ch. 17</td>
<td>Grp Present. &amp; v-Extinction!</td>
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<td>4/12</td>
<td>Development &amp; Evolution</td>
<td>Ch. 18</td>
<td>Guest: David Kingsley, Stanford</td>
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<td>4/19</td>
<td>Human Evolution</td>
<td>Ch. 19</td>
<td>Grp Present &amp; The Mind’s Big Bang</td>
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<td>4/26</td>
<td>The Evolution of Disease</td>
<td>Ch. 13</td>
<td>Grp. Presnt &amp; Evolution. Arms Race</td>
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<td>5/03</td>
<td>Book Reports I</td>
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<td>5/10</td>
<td>Book Reports II, Review Papers Due</td>
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<td>5/17</td>
<td>Present Narwhal Scenario, vote for ‘best of show’</td>
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<td>5/24</td>
<td>Final ‘Exam’ &amp; End of Year Party!</td>
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