Course Syllabus

**Description** – This course provides a comprehensive introduction to all areas of systematic biology, from species description to phylogeny reconstruction. The pervasive role of phylogenetic data in evolutionary biology (e.g., biogeography, character evolution, etc.) and other fields (e.g., epidemiology, anthropology, agriculture, etc.) is highlighted. The integration of systematics with biodiversity sciences is stressed, including the importance of museum sciences, and the role of systematics in conservation biology.

**Course Prerequisites** - The course is open to undergraduate and graduate students having successfully completed BIOL 201A, BIOL 201B, and BIOL 352 (Genetics & Evolution).

**Major Fulfillments** - This course counts as an upper-division elective for Biology Majors, and counts towards both the Emphasis in Zoology and the Emphasis in Evolution & Systematics.

**Format** – Two lectures (50 minutes) and two hours of “activity” per week. Activities to include paper discussions, student projects and presentations, and field trips.

**Meeting Time & Place** – Mon 1-1:50 pm, W 1-3:40 pm; **LS 122**

**Webpage** – [http://www.bio.sdsu.edu/pub/spiders/syst.html](http://www.bio.sdsu.edu/pub/spiders/syst.html) *Includes links to sites that may be useful in learning about Systematics & Biodiversity.*

**Instructor** - Dr. Hedin is interested in biodiversity, systematic biology and arachnids.

**Office Hours** - Tues 11am - 1pm (LS 204F), or by appointment; e-mail communication is encouraged (mailto:mhedin@sciences.sdsu.edu).

**Field Trips** - Students may be expected to participate in fieldtrips to local museums or other sites. These trips will be announced in class.

**Required Materials** - All required readings will be made available to students on Blackboard. Students should expect to read approximately 10 pages per week from the primary literature.

**Grades** – Based on midterm and final exams, student participation, homework, oral presentations and projects. For specifics, see **Page 2.**
Course Content & Learning Objectives: This course stresses the following material and principles:

- Biological Nomenclature & Species Description
- Practical Aspects of Phylogenetic Data Collection & Analysis
- The role of Phylogenetic Biology in Biological Problem Solving
- A Survey of the History of Life on Earth
- Principles of Bioinventory, Biodiversity Conservation

Student learning objectives include the following:

- students will gain a general understanding of the importance, application, and practice of systematic biology
- students completing this course will have experience in the research, design, and delivery of a professional oral presentation
- through essay assignments and exposure to primary literature, students will strengthen their writing and critical thinking skills
- students will gain an appreciation for the use of modern library resources in Biological research
- students will learn to interact and work as a team to solve common problems

Grades: Course grades will be based on (1) three lecture exams, (2) readings & homework assignments, (3) discussion & lecture participation, and (4) student projects (including written report and oral presentation). Points breakdown and percentage of total grade for each is as follows:

<table>
<thead>
<tr>
<th></th>
<th>Points Possible</th>
<th>Percentage of Total</th>
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<tbody>
<tr>
<td>Mid-term Lecture Exams</td>
<td>150 points</td>
<td>30%</td>
</tr>
<tr>
<td>Final Lecture Exam</td>
<td>75 points</td>
<td>15%</td>
</tr>
<tr>
<td>Readings &amp; Homework</td>
<td>125 points</td>
<td>25%</td>
</tr>
<tr>
<td>Class Participation</td>
<td>50 points</td>
<td>10%</td>
</tr>
<tr>
<td>Student Project - Report</td>
<td>60 points</td>
<td>12%</td>
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<tr>
<td>Student Project – Oral Pres</td>
<td>40 points</td>
<td>8%</td>
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A standard grading scale will be used (e.g., > 90% = A, > 80% = B, etc). You must earn at least 50% of the highest score earned in the class to pass this course. Depending upon overall class performance, these percentage cutoffs may be curved slightly (e.g., 88% equals an A-, etc.).

*More details for all assessments will be made available as the semester progresses*
Course Schedule (subject to revision):

Week of Jan 21:
(W) Systematic Biology – An Introduction

Week of Jan 28:
(M) Species & their Discovery
(W) Class Canceled

Week of Feb 4:
(M) Binomial Nomenclature
(W) Species Description
W Activity: Paper Discussion

Week of Feb 11:
(M) Biological Collections
W Activity: visit San Diego Natural History Museum

Week of Feb 18:
(M) Classifications; Identification Tools
(W) The Future of Taxonomy
W Activity: Paper Discussion; Overview of Online Taxonomic Resources

Week of Feb 25:
(M) Phylogenies – What they are, Tree representation
(W) Morphology & Homology
W Activity: Paper Discussion

Week of March 3:
(M) Molecular Systematics
(W) DNA Sequence Alignment
W Activity: Paper Discussion

Week of March 10:
(M) Phylogeny Reconstruction I
(W) Mid-term Exam I

Week of March 17:
(M) Phylogeny Reconstruction II
(W) Introduction to Character Evolution
W Activity: Paper Discussion

Week of March 24:
(M) Character Evolution II
(W) Character Coevolution, Comparative Tree Shapes
W Activity: Paper Discussion
Week of March 31 (Spring break March 31 – April 4): no class

Week of April 7:
(M) Intraspecific Gene Genealogies
(W) Phylogeography
**W Activity: Paper Discussion**

Week of April 14:
(M) Molecular Species Delimitation (including DNA Barcoding)
(W) Mid-term Exam II

Week of April 21:
(M) Historical Biogeography, Molecular Clocks
(W) Incorporating Fossil Evidence
**W Paper Discussion**

Week of April 28:
(M) Phylogenies in Conservation Biology
(W) Phylogenies in Medicine, Agriculture, Forensics
**W Activity: Oral Presentations of Student Projects**

Week of May 5:
(M) Phylogenies and Human Origins
(W) Final Thoughts
**W Activity: Activity: Oral Presentations of Student Projects**

Week of May 12 (May 10-17 = final exams): **Final Exam**