Goals and Expectations
Although I teach this course with the attitude of training you as plant systematists, you will inevitably forget some of the details of this material. But, I hope that you will retain the big ideas: 1) appreciate the beauty and intricacy of plants and enjoy discovering aspects of nature; 2) improve your skills in memory, observation, writing, and critical thinking; 3) gain a useful, base knowledge of the structure, function, and evolutionary history of plants; 4) learn how scientific research is conducted and present the findings of research through application; 5) learn to actively discuss scientific material and effectively give a presentation.

Course Objectives
After completing the course, students should be able to:
1. state, define, and give examples of the components of taxonomy: description, identification, nomenclature, and classification.
2. recite the basics of the theory and methodology of phylogenetic systematics and how it is applied in research.
3. draw cladograms of the major lineages of plants, indicating their classification, major evolutionary events, and adaptive significance of those evolutionary changes.
4. describe a plant, using the descriptive terminology of plant morphology, and some aspects of anatomy, embryology, palynology, and reproductive biology.
5. name, classify, and diagnose several of the major families of flowering plants.
6. collect (including properly recording field data), identify, and process a plant for an herbarium specimen.
7. know how to use an herbarium and to access herbarium databases.
8. state the principles and rules of plant nomenclature, including how to publish a new taxon name, and know how to use and apply botanical names.
9. design and implement a project in plant systematic research and use the major literature sources.

Students will be assessed for the above skills with quizzes, exercises, lecture exams, lab practicals, and a research presentation project.

Format of class:
1:00 pm - 1:10 pm (Class starts 1 pm sharp!). Quiz on previous class's topic.
1:15 pm - 2:00 pm Lecture of new topic.
2:00 pm - 2:10 pm Break.
2:15 pm - 4:30 pm Lab/Discussion of new topic.
4:30 pm - 4:40 pm Closure: Review of the day's topic, occasional pre-quizzes.

Classroom Procedure
Please bring your textbook and lab manual to every class. Arrive to class on time, 1:00 pm, and plan to stay for the full period of the class, ca. 4:40 pm. If you are late, come right in and sit down while I'm talking. (But note that quizzes start at 1:00 pm and are taken up at 1:10 pm.) Turn off all cell phones (no texting!) during lecture and lab (you may use them outside the classroom or during the break) and keep laptop computers closed unless we are doing a specific computer exercise. Discussion about plant systematics is expected and encouraged, but always interact with me and other students in a respectful and civil manner. Keep personal conversations to a minimum. (Go outside if you feel so compelled.) Most people, including me, require quiet and absence of distractions in order to focus on something. Feel free to go to the restroom if needed; just try to avoid doing so during the first hour and after ca. 4:00 pm. Always be neat and clean up your area completely at the end of class; use the hand brush as needed. Note: Be aware that you are responsible for all lecture notes, supplements, and additional readings for the exams. If you miss a class, you are responsible for making up that missed lab and for getting homework assignments and supplements.
**Discussion**

This class is oriented toward original observation and discovery, reviewing, and discussing. The "topic" will generally correspond to all or part of a book chapter and possibly a research article. Occasionally, I will have you get into groups of 2-4 people and discuss, recite, or review material. I welcome feedback as to the most effective and interesting way to learn.

**Homework Assignments**

Most homework assignments are to answer select Chapter Review Questions (see Schedule for which ones) for a topic. Occasionally, other assignments will be given, e.g., a quick summary or specific questions on a research article. Homework assignments are graded based on a quick perusal of certain questions. They are due at the start of each period on the previous day's material, and there are no make-ups. I will drop only one (the lowest score). Homework accounts for 5% of your grade.

**Quizzes**

There will almost always be a daily quiz on the previous class's topic, although non-graded pre-quizzes may be given the period before. The purpose is to test your knowledge and to help you to keep up with the material in the course. Quizzes start at 1:00 pm sharp and are taken up at ca. 1:10 pm, and there are no make-ups (except under extenuating circumstances). So, it's important for you to arrive to class on time. The lowest quiz grade is dropped, so you do have one reprieve for being late or ill. Quizzes count for 1/5 (20%) of your grade.

**Exercise Presentations**

To give you experience in reviewing a given topic and presenting the results to a group of your peers, I will assign each of you to do one exercise selected from a given book chapter. You will need to research the topic well ahead of time, then prepare a presentation (gen. at end of class) that will last no more than 10 minutes. You may use the board, give handouts, and/or use Powerpoint for your presentation. Please use this as an experience in teaching. Present the material in a clear, enjoyable, enthusiastic manner and encourage discussion. Counts as 2 quiz grades.

**Plant Identification**

With each plant group we study, we will select a few species to learn, usually from cultivated plants on campus. We will keep a running list of these species through the semester. You are responsible for knowing the scientific name of the species (correctly spelled) and its family or group and will be tested on them during quizzes or lab practicals.

**Exams**

These will generally consist of a lab practical followed by a lecture exam. Lab practicals consist of on-site identification of plants and plant parts and identity of major group, family, and/or species. The first portion of the lab practical consists of a number of stations, with a 1.5–2 minute time period to answer the questions at that station. General questions are: what is this? to what major group/family/genus/species does this belong? We may also go outside for a test on species and family/group identification. The second portion of the lab practical may include material for dissection and identification and a more lengthy elaboration of features of that material. The lecture exam covers facts and concepts of lecture material only (although in this course, lecture and lab intergrade). The exams will mostly entail rote response of information, with many questions directly or modified from the chapter review questions. But some questions will demand a degree of synthesis. The typical format for lecture exams will be short answer, short essay, and usually one longer essay question, synthesizing information from several facets. Grading for essay questions will be based in part on organization, grammar, and prose. Thus, it is strongly suggested that you spend a minute or two jotting down an outline of what you wish to say before you begin writing.

**Herbarium Collection**

Each student will be required to collect a total of 2 plants (native or cultivated) and properly process them (with labels) for herbarium specimens. Specimens are mounted on herbarium paper as part of your grade, equal to 2 quizzes.

**Laboratory Notebook**

You will need to keep a laboratory notebook for the duration of the course. This notebook should contain illustrations that you make during lab, primarily those that are listed for you to draw in the laboratory exercises. The notebook may be of two possible formats: a bound lab notebook, available at the bookstore, or 3-hole punched white
paper, placed in a separate 3-ring notebook. I will evaluate your drawings early in the semester (after the first week or two) to give you suggestions, but these will not be graded.

**Field Trips**

Field trips (San Diego Botanic Gardens or possibly the S.D. Zoo or Huntington Botanic Garden) are required for the course. All are intended for review of current material. Additional optional field trips may be offered to those interested, during which you may collect.

**Research Project**

A final goal of the course is to apply knowledge of plant systematics in the form of a project. Everybody will select a plant family to study, **only one family per student**. For one species of that family you will write a detailed description, using Appendix 1. You will prepare illustrations and photographs of this species, including aspects of vegetative and reproductive morphology (flowers and flower parts from whole and variously dissected specimens). You will also include a reference to a vouched herbarium specimen. In addition, you will write about the family: circumscription, apomorphies, phylogenetic relationships (to other families and within the family), economic, biogeographic, and ecological significance (as well as possible data on anatomy, physiology, embryology, and palynology). Finally, you will identify and complete a research question on the selected family, and present the M&M, results, and discussion/conclusions for your project, this counting 10% of your total grade for the project.

A poster of your project will be prepared at the end of the semester and the poster, and a 10 minute presentation will be judged by your peers as well as by me. To help you with this, I will have the class as a whole contribute to making a "rubric", a list of characteristics of both a good poster and a good presentation.

**Required supplies**

- Pencils: 2H (or 3H), for drawing. Eraser if needed.
- 3-ring notebook (for lab and initial lecture hand outs)

**Recommended supplies**

- Hand lens ("loupe"), 10X (- 14X): available in bookstore. Better (and more expensive) hand lens are available for order. I recommend the 10X Bausch & Lomb Hastings triplet, ca. $36; see, e.g., [www.kooters.com](http://www.kooters.com).

**Required Books and Manuals:**

- **Lab Manual:** Simpson, M. G. 2012. Plant Systematics Lab Manual. (availability to be announced)

**Optional Books (available in bookstore)**


**Grading (percentages of lab practicals or mid-term exams based on total class time for that unit)**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Homework assignments</td>
<td>5%</td>
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<tr>
<td>Quizzes &amp; Exercises</td>
<td>20%</td>
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<tr>
<td>Exam #1</td>
<td>20%</td>
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<tr>
<td>Exam #2</td>
<td>20%</td>
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<tr>
<td>Exam #3</td>
<td>20%</td>
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<tr>
<td>Research Project (Poster)</td>
<td>15%</td>
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<tr>
<td><strong>Total:</strong></td>
<td><strong>100%</strong></td>
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Letter grades will be assigned according to standard categories: A = 90-100%; B = 80-89.9%; C = 70-79.9%; D = 60-69.9%; F = <60%. The top and bottom 2-3% of each category might earn +/- grades depending on class distributions. **No electronic devices (e.g., cell phones, ipads, ipods, calculators) may be used/worn during an exam.**
### Schedule: version 1 (27 Aug. 2012)

<table>
<thead>
<tr>
<th>Wk</th>
<th>Date</th>
<th>Text Chapter, In-class exercises</th>
<th>Lab</th>
<th>Text Homework Assignment: Q=Questions; E=Exercises</th>
</tr>
</thead>
</table>
| 1  | Aug. 28 | Ch. 1: Plant Systematics Overview  

 Ch. 16: Botanical Names (p. 621)  

 Ch. 16: Botanical Names | Ch1: E1-3; Lab1: Diversity of plants  

 Lab 16: Botanical Names | Ch1: Q1-32;  

| 2  | Aug. 30 | Ch. 2: Phylogenetic Systematics  

 Lab 2: Cladogram inference exercises  

 Ch2: Q53.54; E1 | Ch2: Q1-7, 9,14-18, 21b, 22-28, 35, 44, 46, 48, 49-52 |
| 3  | Sept. 4 | Ch. 3: Evolution of Green and Land Plants  

 Lab 3: Green and land plant apomorphies & diversity: mosses, liverworts, hornworts. | Ch3: Q1-42 |
| 4  | Sept. 6 | Ch. 4 Evolution of Vascular Plants  

 Lab 4: Vascular Plant apomorphies; diversity of lycophytes (if time) | Ch4: Q1-38 |
| 5  | Sept. 11 | Ch. 4 Diversity of Vascular Plants  

 Lab 4: Vascular Plant diversity of ferns;  

 campus field trip. | Ch4: Q39-76, 82-85 |
| 6  | Sept. 13 | Ch. 5 Evolution of Seed Plants  

 Lab 5: Seed Pl. apomorphies, diversity | Ch5: Q1-20 |
| 7  | Sept. 18 | Ch. 5 Diversity of Seed Plants  

 Lab 5: Seed Pl. diversity of cycads, conifers,  

 Gnetales; campus field trip | Ch5: Q21-31 |
| 8  | Sept. 20 | Ch. 6 Evolution of Angiosperms  

 Lab 6: Angiosperms apomorphies  

 Movie: Sex. Encounters of the Floral Kind | Ch6: Q1-21 |
| 9  | Sept. 25 | Exam 1: Chs. 1-6; 16 (Bot. Names only)  

 (8 periods) |  |
| 10 | Oct. 2 | Ch. 9 Plant Morphology: Roots, stems,  

 leaves, general terminology | Lab 9: Root, stem, and leaf morphology  

 Ch9: Q1-24, 96-99 |
| 11 | Oct. 4 | Ch. 9 Plant Morphology: Leaves, general  

 terminology | Lab 9: Leaf morphology  

 Ch9: Q25-31; 100-117 |
| 12 | Oct. 9 | Ch. 9 Plant Morphology: Flowers, general  

 terminology | Lab 9: Flower morphology, illustration  

 Ch9: Q32-58; 118-127 |
| 13 | Oct. 11 | Ch. 9 Plant Morphology: Flowers &  

 inflorescences, general terminology | Appendix 3; Lab 9: Fl. morphology; inflorescences  

 Ch9: Q59-80; 128-136 |
| 14 | Oct. 16 | Ch. 7 Basal angiosperms  

 Ch. 15 Plant Identification | Lab 7: Basal angiosperms  

 Lab 15: Plant Identification, keys  

 Ch7: Q1-8,11-22  

 Ch15: Q1-16 |
| 15 | Oct. 18 | Ch. 7 Monocots;  

 Ch. 16 Pl. Nomenclature (part 1) | Lab 7 Monocots: Basal, Liliales; Asparagales  

 Ch7: Q23-41  

 Ch16: Q1-29 |
| 16 | Oct. 20 | Fieldtrip: San Diego Botanic Garden  

 Morphology, Monocots |  |
| 17 | Oct. 23 | Ch. 7 Monocots: Commelinids;  

 Ch. 16 Pl. Nomenclature (part 2) | Lab 7: Monocots: Commelinids  

 Ch7: Q42-54  

 Ch16: Q30-52 |
| 18 | Oct. 25 | Ch. 7 Monocots: Poales;  

 Ch. 18 Herbaria | Lab 7: Monocots: Poales  

 Project Bibliography Due  

 Ch7: Q61-62, 64-69  

 Ch18: Q1-25 |
| 19 | Oct. 30 | Exam 2: Chs. 7, 9, 15, 16, 18  

 (9 periods) |  |
| 20 | Nov. 1 | App. 1: Plant Description;  

 App. 2: Botanical Illustration | App. 1 |
| 21 | Nov. 6 | Ch. 8 Eudicots  

 Ch. 17 Plant Collecting | Lab 8: Eudicots: Basal  

 Lab 17: Plant Collecting  

 Ch8: Q1,14,15,17,19-28,50  

 Ch17: Q1-17 |
| 22 | Nov. 8 | Ch. 8 Eudicots;  

 Ch. 19 Species and Conservation | Lab 8: Eudicots: Rosids  

 Species Description, Illustrations Due!  

 Ch8: Q51,52,55-60,72-76, 81-86,90-91,94  

 Ch19: Q1-20 |
| 23 | Nov. 10 | Fieldtrip: San Diego Botanic Garden  

 Eudicots |  |
| 24 | Nov. 13 | Ch. 8 Eudicots;  

 Ch. 19 Species and Conservation | Lab 8: Eudicots: Rosids;  

 Ch8: Q1-14,15,17,19-28,50  

 Ch19: Q1-40 |
| 25 | Nov. 15 | Ch. 8 Eudicots;  

 Ch. 19 Species and Conservation | Lab 8: Eudicots: Asterids | Ch8: Q130,135-137,143,144, 146,147,149,150,154-157, 159,160,162-165,171-174  

 Ch19: Q1-40 |
| 26 | Nov. 20 | Ch. 13 Reproductive Biology  

 MoviE: Sex. Encounters of the Floral Kind | Lab 8: Eudicots: Asterids  

 Ch13: Q1-21  

 Ch8: Q177-179,186-191 |
| 27 | Nov. 22 | HOLIDAY: Thanksgiving |  |
| 28 | Nov. 27 | Ch. 14 Plant Molecular Biology;  

 Lab 14: Molecular data; Gienbank | Ch14: Q1-16 |
| 29 | Nov. 29 | Ch10 Plant Anatomy  

 Ch11 Plant Embryology  

 Ch12 Palynology | Ch10:  

 Ch11:  

 Ch12: |
| 30 | Dec. 4 | Exam 3: Chs. 8, 13, 14, 17, 19  

 (8 periods; Ch 10, 11, or 12 extra credit) |  |
| 31 | Dec. 6 | Projects | Projects |
| 32 | Dec. 11 | Poster Presentation, 1-3 pm |  |
| 33 | Dec. 13 | Poster Presentation, 1-3 pm |  |