

**SYSTEMATIC BOTANY
BIOL 452 - SYLLABUS
SPRING 2009**

Instructor: Eric DeChaine
Office: BI 237
Office hours: M 1:00-2:00 pm
& by appointment
Lecture: MWF 11:00-11:50 am
Lecture room: BI 139
Lab: F 12:00-3:50 pm
Lab room: BI 249
Prerequisite: BIOL 206



Required Textbooks

Judd, WS, CS Campbell, EA Kellogg, PF Stevens, and MJ Douglas. 2008. *Plant Systematics: A Phylogenetic Approach*, 3rd ed. Sinauer Associates, Inc. Sunderland, MA.

Hitchcock, CL & A Cronquist. 1973. *Flora of the Pacific Northwest*. University of Washington Press. Seattle, WA.

Course Objectives

After completing this course, students should:

1. be able to explain and apply their understanding of the principles of evolutionary biology and the phylogenetic relationships of plants;
2. be familiar with the terminology, tools, and lab/field techniques for identifying plants using dichotomous keys;
3. be familiar with the distinguishing characteristics of plant families, particularly those native to the Pacific Northwest of North America;
4. be able to collect, identify, and process a plant for an herbarium specimen;
5. be proficient with the skills necessary for performing a botanical survey, including a written report in standard scientific format.

Evaluation

Students will be assessed for the above skills through a combination of quizzes, lab assignments, a practical exam, a collection, and participation in a botanical survey. Grading will be as follows:

<u>Requirement</u>	<u>% Grade</u>
Lab notebook	25%
Arboretum survey	10%
Plant collection	30%
Final practical	35%

<u>Grade</u>	<u>%</u>	<u>Grade</u>	<u>%</u>
A	93+	C+	77-79
A-	90-93	C	73-77
B+	87-89	C-	70-73
B	83-87	D	60-69
B-	80-83		

LECTURE SCHEDULE

<u>Week</u>	<u>Date</u>	<u>Topic</u>	<u>Reading - Judd et al.</u>
1	4/1	Introduction to plants of the Pacific Northwest	
	4/3	Classification and Phylogenetics	Ch. 1, 2
2	4/6	Binomial nomenclature	Ch. 3, App. 1
	4/8	Dichotomous Keys	App. 2 (p. 557-560)
	4/10	Gymnosperms of Sehome Arboretum	Ch. 8
3	4/13	Vegetative morphology	Ch. 4 (p. 54-61; 81-87)
	4/15	Floral morphology	Ch. 4 (p. 61-67; 87-95)
	4/17	<i>Basal Angiosperms and Monocots</i>	Ch. 9 (p. 232-276)
4	4/20	Get outside and begin collections!	
	4/22	<i>Keying out the Poales</i>	Ch. 9 (p. 276-306)
	4/24	Angiosperms at Washington Park	
5	4/27	Pollination and breeding systems	Ch. 4 (p. 67-72)
	4/29	<i>Basal Tricolpates</i>	Ch. 9 (p. 307-317)
	5/1	<i>Basal Rosids</i>	Ch. 9 (p. 318-345)
6	5/4	Fruits and seeds (bring in to key out)	Ch. 4 (p. 72-80)
	5/6	Plant dispersal	Ch. 4 (p. 80)
	5/9	<i>The Methow – Flowers east of the crest</i>	
7	5/11	<i>Eurosids I</i>	Ch. 9 (p. 346-410)
	5/13	<i>Eurosids II</i>	Ch. 9 (p. 410-440)
	5/15	<i>Eurosids lab</i>	
8	5/18	Species concepts and barriers	
	5/20	Speciation in plants	Ch. 6 (p. 120-150)
	5/22	<i>Basal Euasterids and Euasterids I</i>	Ch. 9 (p. 440-494)
9	5/25	No class - Memorial Day	
	5/27	Arboretum and collection wrap-up	
	5/29	<i>Euasterids II (Arboretum & collections due)</i>	Ch. 9 (p. 494-515)
10	6/1	Hybridization & polyploidy (Lab notebooks due)	
	6/3	Origin & Diversification of the PNW flora	Ch. 6 (p. 122-127)
	6/5	Review trip to Mt. Baker (like a quiz)	
11	6/8	Final Practical Exam 10:30-12:30	

LAB SCHEDULE:

<u>Week</u>	<u>Date</u>	<u>Topic</u>
1	4/3	Introduction to herbaria
2	4/10	Gymnosperms of Sehome Arboretum
3	4/17	Basal Angiosperms and Monocots
4	4/24	Spring flowers – Washington Park
5	5/1	Basal Tricolpates to Basal Rosids
6	5/9	Flowers east of the crest (date may vary)
7	5/15	Eurosids
8	5/22	Basal Euasterids and Euasterids I
9	5/29	Euasterids II
10	6/5	Review trip to Mt. Baker

SYSTEMATIC BOTANY LAB

Laboratory notebook

You will need to keep a laboratory notebook (of plain white paper) for the duration of the course. I will evaluate your laboratory assignments early in the quarter to give you feedback. Lab assignments consist of making detailed drawings and descriptions of characters observed from specimens in class as well as using dichotomous keys to identify particular species of interest. 10% will be lost for each day the notebook is late.

Herbaria experience

As part of the lab, and in order to provide students with more opportunities to become familiar with taxonomic characters as well as the regional flora, each student will be responsible for 3 hrs of specimen curation in the herbarium (WWB). Responsibilities will vary based on the needs of the herbarium and student interests, and may include organization, mounting, databasing, etc.

Required tools

Please bring the following to each lab and field exercise: 10x hand-lens, drawing pencils and a good eraser, lab notebook with plain white paper for illustrations, small lined notebook for recording data during field collections, and Hitchcock & Cronquist.

Extra-credit

Each week, extra credit points are available for students who bring in 5 native species in flower, their names, information on the site where they were found, and the plant itself or an identifiable photo of it that shows its characters as well as a photo of it growing in its natural environment. These 5 plants will get you 0.5% extra credit points, which over the 10 weeks could add up to 5% by the end of the quarter! Each of the 5 plants must be new to the extra-credit list - not having been submitted previously by you or anyone else and you can only submit 5 species per week. Just to avoid confusion, the first time that you can submit your 10 plants for the week will be at 10am on Monday. I will be in my office at that time.

Botanical Survey of the Sehome Arboretum

This quarter, each student will be responsible for performing a baseline botanical survey and identifying plants along nature trails within the Sehome Hill Arboretum. The purpose of the inventory is to assemble the present condition of the Sehome Hill Arboretum for short and long term monitoring of the land. The mission of the Sehome Hill Arboretum is "to preserve the unique educational, research, aesthetic, and recreational opportunities." As a class, we will assist the Sehome Hill Arboretum in achieving their goals through performing an inventory of native and invasive plants on their land and labeling plants with ID tags along the trails. This exercise will provide the students with an opportunity to learn native and invasive plants in the field and allow students to demonstrate their knowledge of the local flora.

For the botanical survey, students will be responsible for choosing a trail to evaluate, performing a species inventory of the vegetation along the trail, identifying and labeling native plants, and writing-up their findings in a formal report to the instructor. The actual survey should be performed by 4 students as a group, for safety and completeness. The assessment should include the name of the trail (and map), the dates of the evaluation, a brief description of the trail (length, elevation, aspect, etc.), a table listing the native (highlighting those that were labeled) and invasive species, and a description of the dominant species and the locations along the trail where they occur. The proportion of each species should be illustrated in a pie-diagram in the final report. The report should be no more than 1 page (plus figures) in length and emailed to the professor on the due date.

Plant Collection and Identification (see Judd et al. 2008 appendix 2)

As part of the requirements for this course, each student will make a plant collection of pressed, properly identified native plant species. The collection must include 30 specimens, and must represent plants from at least 20 different families. For the purpose of the collection, family designations will be based on Hitchcock and Cronquist, not Judd et al. No more than five of the samples may be trees in winter condition. In addition, the collection must include at least one specimen each from the Poaceae, Cyperaceae, and Juncaceae. Furthermore, the samples must represent native species (not cultivated species) and must be collected and pressed to show relevant features (leaves, stems, flowers, fruits) that will allow their identification.

Use a sharp digging tool to collect the above-ground and underground (where appropriate) parts of a healthy plant in reproductive condition (flowering and fruiting or sporulating). Place specimens individually between newspapers in a field press so they wilt in place. Selective pruning may be necessary. Place name, date, and collection number with specimen and record data in field notebook. Each specimen must be identified to species.

Each sample must also include a label that contains the scientific name (genus species (family)) and authority, location (country, state, county, map coordinates, precise information so the site can be relocated), a site description (elevation, substrate or soil type, slope, aspect, drainage), habitat description (typically dominant species and community type; where appropriate, species abundance, cover, successional status, life forms, phenology, adjacent communities and their influence, animal interactions), specimen description (abundance, annual/perennial, height, reproductive characteristics), collector's name, collection number (just number them from 1-30), and date of collection. The labels must be typed or printed on a computer in permanent ink.

Example label:

Penstemon davidsonii Greene var. menziesii (Keck) Cronquist
(Scrophulariaceae)

CLALLAM CO: Olympic National Park; Deer Park 18-19 m S
of intersection of hwy. 101 and rd. to Deer Park (on Blue Mt.);
woods mostly of Abies lasiocarpa, with some Pinus contorta;
elevation 5850-6000 feet; perennial with woody stems,
occasional on rocky slopes near summit; flowers lavender-
purple with bluish tinge distally

Eric G. DeChaine 2569

25 July 2001

Ten of the 30 samples must be appropriately mounted on herbarium paper with water-soluble glue; affix labels preferably in lower right corner. The other specimens may be loose in folded newsprint (11"x16") with label.

The collection is worth 100 points. Each sample is worth +3 points. Misidentification to family results in -5 points. Misidentification to genus results in -3 points. Misidentification to species results in -1 point. Your collection will also be assessed for its quality (+10 points). A poorly-prepared specimen or an inadequate label will be penalized by -1 point. Incomplete samples will be penalized by -3 points.