

**Plant Morphology and Systematics
Biology 252
Fall, 2005**

**Prof. Charles Umbanhowar
Science Center 258, x3397, ceumb
Office Hours: Friday, 2-4 PM, Tuesday 9-11
or by appointment**

Texts: Harris, J.G. and M.W. Harris. 2001. Plant identification terminology, 2nd Ed. Spring Lake Press. Spring Lake, Utah.
Rudall, P. 1994. Anatomy of flowering plants: an introduction to structure and development. Cambridge University Press, England.
Young, P. 1982. The botany coloring book. Barnes and Nobles Books. New York.

Introduction

Welcome to Biology 252, and a semester investigating the morphology and systematics of plants. The goals of the course are to provide you with (1) an overview of plant morphology and anatomy (with special reference to the Angiosperms), (2) training in the identification of plants, and (3) an introduction to the major ideas in plant evolution and systematics. Plant morphology and systematics are often taught as separate courses but are intellectually and historically intertwined. We will necessarily have to skip some topics, but a major question we will address is the evolution of plant form.

While successful completion of this course will require memorization, the emphasis is on theory and problem solving. The course texts is listed above and will be supplemented with additional readings throughout the semester. These will be made available via the class Moodle page or will be handed out to you..

A researcher will often try new approaches/techniques to try to solve a problem, and in that spirit, we are going to try something different. Class will always meet in the laboratory (SC 227) so that we can have a direct look at examples of the different concepts and ideas we will discuss. Our scheduled times are T, Th 8:00-9:25 for the whole class and then as sections either at 1:20-4:20 on Tuesday. Be prepared to have to come in at times outside of the normally scheduled labs and lectures.

Grading

A total of 420 points are possible (no extra credit), divided among the following categories:

Plant Identification Exam	50
Examinations (Midterm and Final)	200 (100 * 2)
Form and Function Paper	75
Systematics Paper	75
Participation	<u>20</u>
Total	420 points

A 5% / day reduction in grade will be assessed for missing any deadline unless you speak with me first.

Field Identification Exam

This exam will be based on our campus field trips during the first two weeks of the semester and will require you to sight ID a minimum of 60 different plants (Latin *Genus species*, or common name for 1/2 credit) and to be able to describe the type and arrangement of leaves they possess.

Examinations

The exams will be of a short answer and essay format and will cover material from both lab and lecture. Be prepared to apply the material we learn to new situations/ problems. Use your notes as a guide to the level of detail I expect you to have mastered. Sample questions may be provided to help you study. The final exam is non-cumulative.

Papers

You will be asked to write two papers (2000-2500 words). The first paper will focus on plant form and function and a first draft is due Oct. 14. The second paper will focus on a question related to plant systematics and the first draft will be due Dec. 2. I will comment on these first drafts and hand them back to you within 2-3 days and a final draft will be due a week after the first draft is returned to you. More detailed instructions about format and expectations for first and final drafts will be provided.

Tentative Syllabus

<u>Date</u>	<u>Topic(s)</u>		<u>Reading</u>
Sept. 9	Introduction to Plant Morphology and Systematics		
Sept. 12	Basics of Field Botany and Plant Identification	Lab 1: Field Identification	Harris & Harris
Sept. 14	Ethnobotany and Scientific Traditions of Classification		Gemedo-Dalle reading
Sept. 16	Field Identification of Plants		Harris & Harris
Sept. 19	Hierarchical Classification and Keys	Lab 2: Asters and Grasses	handout
Sept. 21	Field Identification of Plants		Harris & Harris
Sept. 23	Evolution Primer and Evolutionary Classification		Padian and Withgott readings
Sept. 26	Plant Evolution: Linking Form and Function	Lab 3: Plant Biomechanics	Young 99-100, Rowe reading
Sept. 28	Plant Evolution: Linking Form and Function		Young 99-100, Rowe reading
Sept. 30	Plant Identification Exam		
Oct. 3	Plant Anatomy and Morphology Overview	Lab 4: Cells & Tissues	Rud 1, Young 56-60
Oct. 5	Roots		Rud 3, Young 61,63
Oct. 7	Stems		Rud 2, Young 62,64
Oct. 10	Secondary Growth	Lab 5: Roots, Stems and Secondary Growth	Rud 2, Young 65-66
Oct. 12	Leaves		Rud 4, Young 67-69
Oct. 14	Leaves	<i>First Draft of Paper One Due</i>	Rud 4, Young 67-69
Oct. 17	Fall Break		
Oct. 19	Flowers		Rud 5, Young 82-88, Lawton-Rauh reading
Oct. 21	Flowers		Rud 5, Young 82-88
Oct. 24	Fruits	Lab 6: Flowers and Leaves	Rud 5, Young 82-88
Oct. 26	Fruits and Seeds		Rud 6, Young 94-98
Oct. 28	Seeds and Seed Germination		Rud 6, Young 94-98
Oct. 31	Midterm	Lab 7: Fruits, Seeds and Seedlings	
Nov. 2	Reproduction and Speciation		Young 72, 86, 89-97
Nov. 4	Reproduction and Speciation		Culley Reading
Nov. 7	Cladistics and Molecular Systematics	Lab 8: Cladistics and Numerical Tax.	handout, Palmer reading
Nov. 9	Cladistics and Molecular Systematics		handout, reading TBA
Nov. 11	Origins of Plants and the Bryophytes		Young 38-40, 52-54
Nov. 14	Early Diversification and Seedless Vascular Plants	Lab 9: Early Plant Groups	Young 73-76, Pryer reading
Nov. 16	Early Diversification and Seedless Vascular Plants		Young 73-76
Nov. 18	Gymnosperms		Young 77-81, Zhou reading
Nov. 21	Gymnosperms	Lab 10: Gymnosperms	Young 77-81
Nov. 23	Thanksgiving Break		
Nov. 25	Thanksgiving Break		
Nov. 28	Origins of Angiosperms	Lab 11: Angiosperms	Qiu, Kenrick, and Sun readings
Nov. 30	Origins, Classification, and Diversification of Angiosperms		Young 88, Soltis reading
Dec. 2	Focus on the Family: Cactaceae	<i>First Draft of Paper 2 Due</i>	Edwards reading
Dec. 5	Focus on the Family: Orchidaceae	Lab 12: Angiosperms	reading TBA
Dec. 7	Focus on the Family: Poaceae		Mathews reading
Dec. 9	Plants and Society		Young 72, reading TBA
Dec. 12	Plants and Society	No Lab	reading TBA
Dec. 15	Final Exam (non-cumulative), 9:00-11:00		