Plant Biology 304 Elements of Plant Systematics Spring 2008

GENERAL COURSE INFORMATION

Lectures: 2:00 to 2:50, Monday and Wednesday - LSII, Rm. 430

Labs: 3:00 to 4:50, Monday and Wednesday - Room 423 LSII

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Office Hours: Tuesday 9-11, or by appointment

Required Texts: Judd, W. S., C. S. Campbell, E. A. Kellogg, and P. F. Stevens. 2008. *Plant Systematics: A Phylogenetic Approach*. Third Edtion. Sinauer Associates, Inc., Sunderland, MA.

Nickrent, D. L. 2008. Laboratory Manual for Elements of Plant Systematics. Purchase from instructor.

Grades: Your final grade will be determined from your performance on two lecture exams, a final and your grades from the laboratory. The actual number of points for each exam or quiz may vary slightly, however the percentage breakdown is as follows:

Lecture Exam I	= 15%
Lecture Exam II	= 15%
Lecture Exam III & Final (comprehensive)	= 20%
Lab Practical Lab. Exam I	= 10%
Lab Practical Lab. Exam II	= 10%
Lab Practical Lab. Exam III	= 10%
Class project	= 10%
Drawings and quizzes	= 10%
Total	= 100%

Your final grade will be based on your total number of points, the performance of other class members and a subjective evaluation of overall class participation. The latter process is equivalent to grading on a curve and will only be conducted at the end of the semester when all points have been determined. Normally, the adjustment is approximately three percentage points. If you know you will miss an exam, please make arrangements with me as soon as possible. Please do not wait until after the exam has been given since no make-ups will be given. This is especially true for laboratory practical exams which can only be given on the scheduled time given the extensive set-up required. If you have three or more exams on one day during finals week, you can reschedule one of them. For review purposes, you are allowed to keep lecture exams 1 & 2 but not the final.

Lectures: This year I have switched from using slides in the lectures to using images on the internet. The lecture notes with links to these images will be available on your class web page, thus you can review these at any time. Many of the images shown will be linked to either the PhytoImages or PlantSystematics.org web sites (see Useful Web Pages below). Your textbook comes with a CD-ROM that includes many of the photographs of vascular plants that you will see in lecture. You can view the CD on any personal computer (PC or Macintosh). In addition, there is another utility called Digital Flowers that is available on the WWWeb (see class web site for URL). DF was developed by Dr. Ken Robertson, Illinois Natural History Survey, Champaign, IL.

Attempts have been made to coordinate the lectures with the labs in this course, so usually you will have already been presented with an introduction to the lab material in that week's lectures. Your lab manual includes overheads of the families that will be discussed in lecture and your text contains line drawings that will also be discussed. You should bring both of these to lecture and lab. And of course, you ***should*** come to lecture and lab ***prepared*** by reading the appropriate chapter in your text and lab manual ***ahead of time***.

Laboratory: Half of the points possible are from the laboratory portion of this class, thus it is extremely important that you attend all the labs. It is difficult to provide the fresh lab material or give quizzes at later dates, but if you know you will miss a lab, please speak to me about making special arrangements. Lab exams utilize photographs of the plants you saw and dissected. These involve ca. 60 questions where you are given 2 minutes per question. The final **lab exam** will be held during the last scheduled lab period.

This year I will be giving students a choice as to the type of Class Project. As with past years, the preparing a plant collection (dried and pressed, labeled specimens) is still an option. In addition, students can prepare digital plant collections. This will involve making detailed photographs of flowers, fruits, and dissections using the stereo microscope and Olympus digital camera setup in the laboratory. Further information about this will be provided as handouts.

Field Trips: We will take two Saturday field trips, the first to Little Grand Canyon (eastern Jackson County) and the second to the Missouri Botanical. These trips are optional but ***highly*** recommended. Remember that you have already paid for these in your class laboratory fee. Also, bear in mind that part of the "subjective evaluation of overall class participation" (above) is determined by student participation in these important components of the class. At MOBOT we get a "behind the scenes" tour of the herbarium and library, something not available to the general public. The Little Grand Canyon field trip is an excellent opportunity to see beautiful spring wildflowers and to review families.

LECTURE AND LAB SYLLABUS PLB 304

Date	**Lectures** (Chapter: Pages)	**Labs**
Week 1		
Mon 1/14	The Science of Plant Systematics (1:1-12)	Use of Microscopes
Wed 1/16	Vegetative Morph. (4:53-61)	Vegetative Morph. 1(Greenhouse)
Week 2		
Mon 1/21	***M. L. King holiday; no Classes***	
Wed 1/23	History of Classification (3:39-52).	Vegetative Morph. 2 (Greenhouse)
Week 3		
Mon 1/28	Plant Nomenclature (App. 1:543-552)	Winter Botany 1
Wed 1/30	Plant Nomenclature	Winter Botany 2 Keys (App. 2:557-560)
Week 4		
Mon 2/4	Methods of Systematics (2:13-38) (responsible for stuff on web page)	Herbarium, Collecting (App. 2:553-557) Computer Lab (text CD, DF)
Wed 2/6	Pteridophytes (8:185-206)	Pteridophytes
Week 5		
Mon 2/11	Gymnosperms (8:206-224)	Gymnosperms
Wed 2/13	Origin, phylogeny angiosperms (7:175-181)	**Practical Lab Exam I**

Week 6		
Mon 2/18	**Lecture Exam I (thru 2/13)**	Inflorescences (4:72-74) (Lect. & Lab.)
Wed 2/20	Floral Morphology (4:61-67)	Floral Morphology (4:61-67)
Week 7		
Mon 2/25	Floral Morphology II following orders/families all chapter 9; see table 9.1 (pp. 230-231) for exact page numbers	Fruits (4:75-79) (Lect.&Lab.)
Wed 2/27	Magnoliales, Laurales	Magnoliaceae, Annonaceae, Lauraceae
Week 8		
Mon 3/3	Nymphaeales, Ranunculales	Berberidaceae, Ranunculaceae, Papaveraceae
Wed 3/5	Caryophyllid clade	Cactaceae, Caryophyllaceae Portulacaceae Polygonaceae, Droseraceae
Week 9	**Sat. 3/8 to Sun. 3/16 Spring Vacation**	
Week 10		
Mon 3/17	Saxifragales	Crassulaceae, Hamamelidaceae, Saxifragaceae
Wed 3/19	Malpighiales	Euphorbiaceae, Clusiaceae, Violaceae, Salicaceae
Week 11		
Mon 3/24	Fabales	**Practical Lab Exam II**
Wed 3/26	**Lecture Exam II (thru 3/24)**	Fabaceae (Mimosoideae, Caesalpinioideae, Faboideae)
Week 12		
Mon 3/31	Rosales	Rosaceae (4 subfamilies), Ulmaceae, Moraceae
Wed 4/2	Fagales, Brassicales, Malvales Sapindales	Fagaceae, Brassicaceae, Malvaceae, Sapindaceae
Week 13		
Mon 4/7	Cornales, Ericales	Cornaceae, Primulaceae, Ericaceae, Sarraceniaceae
Wed 4/9	Solanales, Gentianales	Solanaceae, Rubiaceae, Apocynaceae
Week 14		
Mon 4/14	Lamiales	Lamiaceae, Plantaginaceae, Scrophulariaceae
Wed 4/16	Apiales, Asterales	Apiaceae, Asteraceae
Week 15		
Mon 4/21	Alismatales, Comelinales, Liliales Asparagales	Araceae, Alismataceae, Arecaceae Liliaceae s. lat., Amaryllidaceae
Wed 4/23	Asparagales	Orchidaceae, Iridaceae
Week 16		
Mon 4/28	Poales	Juncaceae, Cyperaceae, Poaceae
Wed 4/30	Review	**Practical Lab Exam III**

Lecture Exam III (material from 3/31 to 4/28) and Comprehensive Final Exam
Wednesday, May 7 at 3:10-5:10 p.m.

Useful Web Pages

Elements of Plant Systematics (PLB 304 class web page)
http://www.plantbiology.siu.edu/PLB304/index.html

Digital Flowers (University of Illinois)
http://www.life.uiuc.edu/plantbio/digitalflowers/

PhytoImages (SIUC)
http://www.phytoimages.siu.edu/

PlantSystematics.org (Cornell University)
http://www.plantsystematics.org

Land Plants Online (SIUC)
http://www.science.siu.edu/landplants/index.html

Botanical Images Data Bases (web page of sites compiled by DLN)
http://www.plantbiology.siu.edu/faculty/nickrent/BotImages.html

Supplemental References

Other Plant Systematics Textbooks

Jones, S. B. and A. E. Luchsinger. 1986. Plant Systematics. Second Edition. McGraw-Hill Book Company. 512 pp.
Radford, A. E. 1986. Fundamentals of Plant Systematics. Harper & Row, New York, NY.
Simpson, M. G. 2006. Plant Systematics. Elsevier Academic Press, New York. 590 pp.
Walters, D. R. and D. J. Keil. 2006. Vascular Plant Taxonomy, Fifth Edition. Kendall/Hunt Publishing Co., Dubuque, Iowa. 608 pp. + index. Used as our textbook in previous years.
Woodland, D. W. 1997. Contemporary Plant Systematics. Andrews University Press, Berrien Springs, MI. 619 pp. Used as our textbook in previous years.

General Taxonomic References

Bailey, L. H. 1949. Manual of Cultivated Plants. MacMillan Publ. Co., New York, NY. 1116 pp.
Benson, L. 1959. Plant Classification. Heath Publ. 688 pp.
Cronquist, A. 1981. An Integrated System of Classification of Flowering Plants. Columbia Univ. Press, NY. 1262 pp.
Cronquist, A. 1988. The evolution and classification of flowering plants. New York Botanical Gardens, New York, NY. 555 pp.
Heywood, V. H. 1978. Flowering Plants of the World. Mayflower Books, New York, NY. 336 pp.
Hortus Third. A Concise Dictionary of Plants Cultivated in the United States and Canada. 1976. MacMillan Publ. Co., New York, NY. 1290 pp.
Mabberley, D. J. 1997. The Plant-Book, Second Edition. Cambridge Univ. Press. 858 pp.
Radford, A. E., et al. 1981. Vascular Plant Systematics. Harper and Row. 891 pp.
Soltis, D. E., P. S. Soltis, P. K. Endress, and M. W. Chase. 2005. Phylogeny and Evolution of Angiosperms. Sinauer Associates Inc., Sunderland, MA.
Takhtajan, A. 1997. Diversity and Classification of Flowering Plants. Columbia University Press, NY. 643 pp.
Wood, C. E. 1974. A Student Atlas of Flowering Plants: Some Dicotyledons of Eastern North America. Harper and Row.
Zomlefer, W. B. 1994. Guide to Flowering Plant Families. University of North Carolina Press, Chapel Hill, NC. 424 pp.

Local Floras

Deam, C. C. 1940. Flora of Indiana. Dept. Conserv., Div. Forestry, Indianapolis, IN.
Fernald, M. L. 1970. Gray's Manual of Botany, Eighth Edition. D. Van Nostrand Co., New York. 1632 pp.
Gleason, H. A. and Cronquist, A. 1991. Manual of Vascular Plants of Northeastern United States and Adjacent Canada, Second Edition. New York Botanical Garden, N.Y. 910 pp.
Jones, G. N. 1963. Flora of Illinois. The University of Notre Dame Press, Notre Dame, Indiana. 401 pp.
Mohlenbrock, R. H. 1986. Guide to the Vascular Flora of Illinois. Southern Illinois University Press, Carbondale. 507 pp.
Mohlenbrock, R. H. 1970--x. The Illustrate Flora of Illinois. Southern Illinois University Press, Carbondale. Currently 12 vols. on vascular plants are finished (project is ongoing).
Mohlenbrock, R. H. and D. M. Ladd. 1978. Distribution of Illinois Vascular Plants. Southern Illinois University Press, Carbondale.
Steyermark, J. 1963. Flora of Missouri. Iowa State Univ. Press, Ames, Iowa. 1728 pp.
Yatskievych, G. 1999. Steyermark's Flora of Missouri. Vol. 1. The Missouri Botanical Garden Press, St. Louis, MO. 991 pp.
Yatskievych, G. 2006. Steyermark's Flora of Missouri. Vol. 2 (Acanthaceae to Fabaceae). The Missouri Botanical Garden Press, St. Louis, MO.

LABORATORY INFORMATION AND RULES

Lab Meeting Time: 3:00 to 4:50, Monday and Wednesday - Room 423 LSII

Instructor: Daniel Nickrent; Office: Rm. 1005 LSIII. Phone: 453-3223

Lab. Objectives:
- To recognize by sight a selected group of plant families
- To know and demonstrate proper dissection and drawing technique for flowering plants
- To understand the names and relationships of the various plant structures seen during the laboratory.
- To learn the scientific name and family of the plants dissected in the laboratory
- To be able to use a key to identify an unknown plant

Lab Exams: Three practical exams (10% each) will be given during the semester covering laboratory topics. These exams will consist of ca. 60 questions that relate to plants you have seen and dissected in lab. Instead of fresh material, high quality color photographs will be projected. You will be given ca. 2 minutes to answer each question which is generally ample time.

Lab Quizzes and Drawings. Short quizzes may be given during lab. periods. These will cover material seen in the previous lab as well as the current lab (to ensure you come to lab prepared). In general, most of the points (that make up this 10%) derive from you drawings.

Class Projects. 10% of your grade will be determined from your class project. Two options are available: 1) a traditional plant collection and 2) a digital plant collection. Details about the traditional plant collection are given in your lab manual. It should consist of six flowering plants taken from six different orders (APG system of classification). They can be obtained anywhere (i.e. not just from Southern Illinois). Rare and endangered plants will **NOT** be accepted. This includes all orchids or any plants collected from an official Illinois Nature Preserve. Herbarium paper will be provided for you. All collections are due during the last scheduled laboratory. Unless you request that the specimens be returned at the end of the semester, you collections will become the property of SIUC Department of Plant Biology and some may be incorporated into the SIU Herbarium.

Instead of a traditional plant collection, you are given the option to prepare a digital plant collection. This will involve making digital photographs documenting the floral and fruit morphology of three Southern Illinois plants. The Olympus stereo microscope and digital camera setup in the laboratory will be used to make macro photographs (see separate handout for instructions on using this equipment). Digital photographs of the plants in the field are also welcome, but at present you must provide your own digital camera for this. All photographs prepared for this class project will be uploaded (by DLN) to the PhytoImages web site, complete with collection locality information. See class handouts for more details on preparing your data for this project.

Additional Purchases: You will need to purchase and bring to lab:
- a drawing pencil (#2.5 is better than #2 which smudges!)
- paper (unruled) for drawings
- a 6" plastic ruler
- a hand lens (optional) is useful on field trips.

Plant Material for Dissection. Whenever possible, we will strive to provide fresh representatives of the various families for dissection. Some will be native plants found outside and some will come from the Plant Biology greenhouse. You are encouraged to visit the PLB greenhouse to review and enjoy! In some (rare) cases you will be provided with fixed or dried plant material for dissection.

Some Rules:
- Laboratory attendance is **required**.
- Bench space should be left **clean** after every lab.
- Come **prepared for lab** by reading your text and lab manual.