Biology 331  Plant Systematics  
Spring 2004  
Course Description and Expectations

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Course goals:  
A general introduction to the biological principles, practices, and philosophies found within the study of vascular plant systematics.  
An appreciation for morphological, and other forms of variation, found in plants and the various ways this variation might be generated, maintained, and evaluated by botanists.  
Practice with the use of technical keys for identification.  
Familiarization with the major vascular plant families found in Alaska and other northern regions.  
Ability to identify recognize several vascular plant families and genera in the field.

An appreciation and basic understanding of the potential contributions to systematics offered by biogeography, floristic studies, and ecological research.

To acquaint you with the many various resources available whenever botanical questions confront you in the future.  
To help you be a much better ÔconsumerÕ, and maybe even an occasional and credible critic, of botanical information relating to systematics.

Course expectations:  
We expect you to attend classes and labs! If you expect to miss a presentation try to arrange for a friend to take notes for you. Remember to check if you have missed any handouts. If you expect to miss an exam or quiz let us know ahead of time. It will be very, very difficult for us to set up makeup quizzes for the lab.

The study of systematics includes many different topics and sometimes different points of view! We are lucky to be having several guest lecturers joining us during the semester. Please give them your full attention, take the opportunity to ask them questions, and, yes! the material and insight they bring to the class lectures will be included in the exams!

Presentations on new families will be made at the beginning of each lab period. This time will also be used to cover any extra class business, pass out handouts, etc. If you will be missing the first 1/2 hr of lab, be sure
to check what
you have missed! Quizzes will be given at the beginning of the lab they are
scheduled for. The remaining lab time will be free for you to study
the new
families, review previous plants covered, and work on your own
collections.
Hopefully we will be able to post additional hours during which you can
use the lab space independently if you need the extra time. We will use
Blackboard to post grades (quickly) for those of you that would like
this option.

Materials to bring to lab:
We will provide dissection scopes and several copies of the floras we will
use. And piles and piles of plant specimens to look at and dissect.
Bring your
own flora if you purchase one and want to write notes in it (see notes below on
class books). Bring paper and pencils suitable for making sketches if
this helps.
Please don’t remove specimens or department-owned floras and glossaries from
the lab for your own personal use as this is horribly unfair to your fellow students.
If you have a 5X, 10X, or 15X hand lens, you will find it useful in
class.
These can be purchased at the U Bookstore, or at Alaska Prospector’s
Supply at
504 College Road (very nice selection, but funny winter hours. Call
first at 452-
7398) If you will be doing botany field work in the future, you will
want one! Prices
range from $5 to $50, depending on what you want.

Books
Several copies of the following recommended books have been
ordered
by the bookstore. Before purchasing any of them (they are expensive!) you might
first have a look at the instructor’s, department’s, or a library copy.
Your decision
may depend on what you want most from the class, and will want to use in the
future. You might try checking the web for a better price, or second
hand copies
for any of these!

- Hulten, E. Flora of Alaska and neighboring territories. ca. $120-
130! This
is still the bible, but a very imperfect one. We have copies in the
lab for you to
use. If you will be doing botany in Alaska, you may consider buying your
own
copy. Will also be on 24 hr reserve at the Bioscience Library.
- Cody, W.J. Flora of the Yukon Territory. Much cheaper and will be
useful
as long as you are working in interior, alpine, or arctic Alaska. No
Alaska maps,
but many keys are improved from Hulten and based on more recent
taxonomic
treatments.
- Judd, et al. Plant Systematics. 2d edition. ca. $80-90. An excellent general and up to date text on plant systematics that you may appreciate if you are headed that way long term. Nice family descriptions and illustrations with a world wide perspective. One copy will be on 24 hr reserve at the Bioscience Library. This text is the favored for many systematic classes throughout North America now.
- Harris and Harris. Plant Identification Terminology. $15-20?. An excellent illustrated glossary that you may want to have on hand in the lab. We'll try to have a couple of copies available.

Other books:
- Briggs, D. and Walters, S.M. Plant variation and evolution. 3rd edition. The standard for the topic. Many suggested readings will come from this text. On 24 hr reserve at the Bioscience Library. Used copies available on the web at $10-30.
- Every botanist should have this one on their shelf.
- Zomlefer, W.B. Guide to Flowering Plant Families. The author is both a taxonomist and an artist and the drawings are excellent. This book will be available during labs and at the Bioscience Library if we find an extra copy.
- Other books and keys or floras will be introduced during the semester as we need them.

If you have never shopped on the web for books, and want to try it ask us for help! Second hand books are now available there and most shipping service is pretty darn quick! Don't tell the bookstore you heard it here!

Reading assignments:
I will frequently list reading suggestions, but these will be supplementary and/or complimentary to the lectures and labs, and will help you cover any material you may have missed during a lecture. These references will often include sources I have used heavily for preparing presentations. They will also be a good review for you. If a reading assignment is truly mandatory I will state so clearly, and we will attempt to have photo or electronic copies readily available. If you have trouble accessing any supplementary reading material, let us know. I
will keep a running list of these reading suggestions on Blackboard.

Grading:
Lecture and lab periods will cover separate, but significantly related, topics. They will count for 55% and 45%, respectively, toward your total class grade. Final grades will be scored on a curve based on the entire class. Note that 3 of the assignments only count for 2 or 3% each, however, these assignments will be designed to be fun, a measure of your independent efforts and critical thinking, and they are practical (i.e. real life stuff). Don’t underestimate their significance. Grading for the exams and assignments will be partitioned accordingly:

**Lecture**
- Exam 1 Feb 23: 13%
- Exam 2 Apr 12: 13%
- Final exam May ??: 23%
- Nomenclature homework: 3%
- Web assignment: 3%

Total 55%

**Laboratory**
- Quizzes (3): 21% (total of 3 at 7% each)
- Final quiz: 12%
- Rare plant mtgs. review: 2%
- Student collection: 10%

Total 45%
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Laboratory Schedule
Irving 103, Tues and Thurs, 2-5 PM

Jan 15  Instructor and TA in lab.
Jan 20  Review of vegetative plant morphology. Introduction to keys.
Jan 27  Ranunculaceae, Papaveraceae
Jan 29  Caryophyllaceae, Portulacaceae
Feb 3  Saxifragaceae, Crassulaceae, Grossulariaceae, Haloragaceae
Feb 5  Polygonaceae, Droseraceae, Review of families for quiz.
Feb 10  QUIZ! Quick post-review of quiz.
         Geraniaceae, Violaceae
Feb 12  Salicaceae, Betulaceae
Feb 17  Fabaceae
Feb 19  Rosaceae
Feb 24  Brassicaceae.
Feb 26  Onagraceae, Myricaceae, Urticaceae. Review of all families.
Mar 2  QUIZ!
         Ericaceae, Pyrolaceae, Empetraceae, Diapensiaceae
Mar 4  Cornaceae, Boraginaceae, Gentianaceae
Mar 9  Plantaginaceae, Scrophulariaceae, Lamiaceae
SPRING BREAK!!! Enjoy! Catch up! Work on personal collections?
Mar 23  Caprifoliaceae, Campanulaceae, some misc. families.
Mar 25  Asteraeae
Apr 1  QUIZ! First 1/2 of student personal collections due.
Apr 6  Gymnosperms, 'fern allies'
Apr 8-9  Alaska rare plant meetings. Submit a brief 'review' of the sessions you attend. More on this later......
Apr 13  Liliaceae, Orchidaceae
Apr 15       Poaceae
Apr 20       Cyperaceae, Juncaceae
Apr 22      'aquatics'
Apr 22        Potamogetonaceae, Sparganiaceae and other misc.
Apr 27      Review families, finish and turn in rest of student
collections, visit Museum Herbarium.
Apr 29       Lab Final Exam
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Lecture Schedule
Irving 201, 1-2 PM Monday and Wednesday

Jan 19           Martin Luther King Day. No class.

Jan 21           Introduction. What is systematics anyway? Quick 'tour' of Alaska's vegetation and flora.
Reading:

Jan 26           Brief introduction to major classifications systems of angiosperms. Artificial vs. natural classifications. Pre-Linnaean efforts to classify plants.
Reading:

Jan 28           Linnaean and early post-Linnaean efforts to classify plants.
Reading:

Feb 2            Variation: observations, experiments, and ranges of morphological variation.
Reading:

Feb 4            Variation: anatomy, secondary chemistry, physiology, developmental, disease, and compensatory growth.
Reading:

Feb 9            Asexual reproduction and vegetative propagation.
Reading:

Feb 11           Sexual breeding systems. Matt Olson.
Reading:

Feb 16           Hybridization, ploidy levels, and other 'problems' with the concept of species. Diana Wolf
Reading:

Feb 18           Speciation, the processes, the controversies, and the problems with plants. Clumpers and splitters.
Reading:

Feb 23           EXAM 1! Through last lecture.

Feb 25           Nomenclature. Nomenclature assignment handed out will be due March 11 in lab.

Mar 1            Origin of the Alaskan and northern flora I. Dave Murray. Reading:

Mar 3            Origin of the Alaskan and northern flora II. Dave Murray. Reading:

Mar 8            Flora of northern Mongolia. Claudia Rector

Mar 10           Biogeography and floristics, the questions, the evidence, the efforts to investigate. Web assignment handed out will be due Mar 25 in lab.
Reading:
SPRING BREAK!!!  Enjoy!  Catch up!  Taxes done?

Mar 22  Designing and executing a floristic inventory. Carl Roland

Mar 24  Overview introduction to the art and science of plant systematics. Dave Murray

Mar 29  Taxonomic methods: earliest rigorous efforts to classify plants using sampling design, statistics, phenetics. Reading:

Mar 31  Taxonomic methods: cladistics. Kent Schwaegerle
Reading:

Apr  5  Taxonomic methods: molecular data. Reading:

Apr  7  Recent investigations in systematics of Alaskan species in the Genus Botrychium, the moonworts. Mary Stensvold.

Apr 12  EXAM 2!

Apr 14  Taxonomic methods: review and examples of efforts combining molecular, ecological, morphological data, and other lines of evidence to develop phylogenies and classifications.

Apr 19  TBA.

Apr 21  Use of greenhouses and common gardens for systematics and other related plant research. Heather McIntyre.

Apr 26  Alaska's rare plants.

Apr 28  Alaska's invasive species. Jeff Conn.

May  3  Review. Look at any live material available!

May ???  FINAL EXAM...comprehensive.