BIOLOGY 311 --PLANT TAXONOMY--FALL 2011

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Office Hours

"official"-- M 11-12, T 10-11, W 8-9, R 11-12, F 9-10

but feel free to try to catch me anytime between 8 and 4

you can leave messages by:

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READING

Newcomb's Wildflower Guide, Lawrence Newcomb; Little & Brown Publishers, ISBN: 9780316604420

Plant Systematics, 2nd Ed. Michael G. Simpson. Academic Press ISBN: 9780123743800

(**optional**) **Plant Variation And Evolution**, 3rd Ed., D. Briggs & S. M. Walters Cambridge Univ. Press, ISBN: 0521459184

CONTENT: The course will cover three related but distinct areas:

(1) a study of the local flora, developing an ability to recognize roughly 100 species of plants common to this area and ecological features that they exhibit.

(2) a study of classical and more recent approaches to plant taxonomy including a study of approximately fifty plant families and the floral characteristics that have been used to define these and other groups. Additionally the philosophy and techniques utilized in different approaches to classification, including cladistic analysis, will be examined.

(3) an examination of the patterns seen in the variation of plants, what biological processes might account for this variation and what the patterns of variation reveal about important biological processes

FIELD TRIPS:

The field trips are essential to the course. We will be going out most Wednesdays throughout the semester. DRESS APPROPRIATELY FOR THE WEATHER!!. We also will have one longer optional outing to the High Peaks of the Adirondacks on Sept. 20-21, which, unlike the other trips, it is NOT required, but it is HIGHLY RECOMMENDED (especially by students who have been on it!). There will be a cost of roughly $30 per person for food and campsite fees for this trip.

REQUIREMENTS:

It is expected that you attend **ALL** the classes--material outside the texts is often covered, administrative details are discussed (e.g..details about assignments). Students are responsible for all material covered in lecture. Attendance in lab **is required (except for the Adirondack trip) unless excused prior to the field trip**. **If you fail to attend all the field trips or fail to complete all the projects then you will fail the course!**

Note that you need to devote additional time besides the field trip time to learn the plants, learning plants and working on projects--do NOT fall behind.

LEARNING OUTCOMES

Upon completion of this course a student will

- Be able to recognize plant species that grow in this area
- Know the diagnostic features and representative genera of plant families
- Be able to discuss the biological processes that contribute to patterns of variation in plants
- Be familiar with processes used to identify plants
- Be familiar with the use of molecular tools in studying and organizing plant diversity

GRADING -- students will be graded in four areas:

- Identification of local flora
- Knowledge of classical concepts of plant taxonomy (families, representative genera, nomenclature)
- Understanding of the theoretical basis for patterns in variation
- Projects, both weekly projects (some done as groups) and several long-term projects

In each of these four areas students will receive a score between 0 and 3, with 1 being an acceptable performance, 2 being a good performance and 3 being an excellent performance. For the four areas these scores relate to the following:

- Identification (based on quizzes in the field and part of the final exam)

Score of "1" --recognize around fifty important and common plants, including **most** with scientific names
Score of "2" --recognize around seventy-five plants including **most** with scientific names
Score of "3" --recognize around one hundred plants, **most** with scientific names

- Knowledge of classical concepts of plant taxonomy (based on two tests and part of the final exam)

Score of "1" –Know 70% of terms and families
Score of "2" –Know 80% of terms and families
Score of "3"—Know 90% of terms and families

- Understanding of the theoretical basis for patterns in variation (based on weekly written assignments (both in-class and out of class, note that you can't do the in-class assignments if you miss class and consequently it is hard to score well if you miss class), two tests and part of the final exam)

Score of "1" --demonstrate in writing that you are familiar with the concepts covered in class and in the book
Score of "2" --demonstrate in writing that you understand and can work (i.e apply them to new situations) with **some** of the concepts covered in class and in the book
Score of "3" --demonstrate in writing that you understand and can work with (i.e apply them to new situations) **most** of the concepts covered in class and in the book

- Projects (weekly assignments plus a group of seven long-term assignments)

Score of "1" -- Complete all assignments
Score of "2" --Do an excellent job on two of the long term assignments
Score of "3" --Do an excellent job on four of the long term assignments

(Note that four each of these areas, failure to accomplish at the '1" level results in a grade of 0 and a failing grade (E) for the course)

The overall grade will be based on the sum of points accumulated in these four areas according to the following scale (assuming projects and laboratories are at least acceptable):

11 pts = A	10 pts = A-	9 pts = B+
8 pts =B	7 pts =B-	6 pts =C+
5 pts =C	4 pts = D	

Less than 4 pts **or** a 0 on any of the four components = E

Projects

Plant collection/family study assignment

- Collect 30 plant specimans from fourteen plant families
  For each speciman have the following
  Scientific name, common name, authority, habitat, location, date of collection
  Characteristics of the family
  Other common genera/species found in this area in the same family
  Other economically or ecologically important members of the family
  Detailed description of the flower and/or fruit
  Distribution of the species and family
- Half of the collection (15 specimans in 7 families) is due by October 12
- Good and excellent jobs would have some of the following:
  More specimans from more families
  Well-pressed specimans displaying useful characteristics
  Specimans other than common trees, roadside weeds and other abundant plants

Technical keying

- Using Gleason and Cronquist's *Manual of the Vascular Plants of the Northeastern U.S.* key out five plants, including one sedge and one grass
- Good and excellent performances would identify more plants

Identification using Newcombe's *Wildflower Guide*

- Identify 15 plants that the class has not covered using Newcombe's guide
- Good and excellent performances would identify more plants

Graminoid project

- Be able to recognize and distinguish grasses, sedges and rushes
- Be able to work with the diagnostic features of the groups
- Good and excellent performances would demonstrate greater ability to identify plants in these groups

Molecular database

- Use a molecular database to classify a group of eight plants
- Good and excellent performances would examine more plants and more than one protein

Endangered species

- Research an endangered plant species, reporting on its relationship to other species, its distribution, causes for scarcity and the species potential for being preserved.
- Good and excellent projects will be well written, utilize more sources and have more substantial analysis

Statistics

- Analyze and group a population of plants looking for patterns in variation of characters and analyzing for potential sources of variation (i.e. analysis of variance)
- Good and excellent projects would be well-written and illustrate mastery of the rationale for statistical analysis and its application in the area of taxonomy.

Weekly: technical key, Newcombe key, flower structure, collection
Bi-weekly: molecular, cladistics, statistics

Week