ADVANCED PLANT TAXONOMY

Department & Course Number: Biological Sciences, BSC 620, BSC 621

Course Title: Advanced Plant Taxonomy **Credit:** 4 Hours **Prerequisite**: BSC 416, 516 or Permission of Instructor

Instructor: Dr. Dan K. Evans
Professor Biological Sciences (Botany)
Science Building 364
Phone: (304) 696-6467 (voice mail)
email: evans@marshall.edu
Office Hours:

Course Description: This course presents a study of variation in plant species and numerical)computer and non-computer) and other laboratory methods for interpreting the importance of variation in species determination. Herbarium collections will be employed in determining species variations. Students will undertake to define variation in closely related species and to demonstrate their research in writing and oral presentation.

Texts:

Stace, C.A. 1989. Plant Taxonomy and Biosystematics. Cambridge University Press. Cambridge, UK. 264pp. Reprinted in 2005.

References on Reserve in the lab:

Fernald, M.L. 1950. Gray's Manual of Botany. 8th Ed. American Book Company, New York.
Gleason, H.A. 1968. The New Britton and Brown Illustrated Flora. 3 vols. Hafner Publishing Company, New York.
Gleason, H.A., and A. Cronquist. 1991. Manual of the Vascular Plants of Northeastern United States and Adjacent Canada. 2nd Edition. The New York Botanical Garden, Brooklyn, NY.
Harmon, P.J. 2000. Atlas of the Vascular Plants of West Virginia. West Virginia Department of Natural Resources. Draft Edition.
Holmgren, N. H. 1998. Illustrated Companion to Gleason and Cronquist's Manual. The New York Botanical Garden, N.Y.
Selected Journal Readings. Reprints on file in the lab.
Stuessy, T. 1990. Plant Taxonomy: The Systematic Evaluation of Comparative Data. Columbia University Press. N.Y.
Stuessy, T. 1994. Case Studies in Plant Taxonomy. Columbia University Press, NY
Walters, D.R., and D. J. Keil. 1998. Vascular Plant Taxonomy. 4th Edition. Kendal/Hunt Publishing Company, Dubuque, Iowa.

Course Objectives:

1. To better understand the biological basis of plant speciation
2. To make practical use of computer and non-computer methods of expressing morphological, anatomical, chromosomal, geographical, and ecological variation in closely related plant species.
3. .To better understand the value of herbarium collections in solving taxonomic problems.

Grading:

First Examination	24%
Presentation	25%
Research Paper	50%

Attendance Policy:

Students are expected to be present and on time for all class meetings. Unavoidable absences such as those due to illness and deaths in the family should be reported to the instructor as soon as possible. More than two absences are considered excessive. Students are responsible for making up missed work, missed exams and picking up class handouts. Lab exams can be made up only if prior notice is given. Field quizzes cannot be made up. If a field quiz is missed, the following quiz grade will be used to calculate the one missed. Where absences are excessive, no consideration will be given for borderline grades.

Course Schedule:

1. Overview of plant taxonomy
   Goals and objectives of systematics and taxonomy
   Student responsibilities

2. Taxonomic resources, Stace 196-210
   Classical manuals, journals, indices, the herbarium
   Interlibrary loans, Internet citations

3. Initiation of a taxonomic study, Stace 211-218
   The research problem
   Problem assignment
   Nomenclature, type descriptions, type collections

4. Bio-geographic analysis
   Maps, atlases, literature reports, herbarium specimens
   Journal article discussion
   Stace 156-177

5. Character selection, variation and measurements
   Data gathering and sample size
   Lab: Select characters, statistical analysis of initial Measurements, Stace 65-85; Walters/Keil 509-523

6. Breeding systems, Stace 129-255
   Hybrid recognition
   Isolating mechanisms

7. Biosystematics, the chromosome, cytotaxonomy, Stace 109-128
   Chromosome atlas, polyploidy, pollen viability
   Journal article discussion
   Lab: Root tip preparation, mitotic counts
   Pollen mother cell preparation, meiotic counts
   Pollen viability
   Camera lucida

FIRST EXAMINATION – DATE:

8. Anatomy as a taxonomic tool, Stace 73-83
   Journal article discussion
   Lab: Microtome, acetate cast, leaf surface characteristics

9. Chemotaxonomy, Molecular Taxonomy, Stace 86-108
   Compounds and methods of analysis
   Journal article discussion
   Guest Speaker

10. Phenetics, phylogenitics and cladistics
    Journal article discussion
    Guest speaker

11. Analysis of taxonomic data
    Standard statistics
    Computer analysis
    Initial computer analysis

12. Graphic presentation of data
    Hybrid index
    Frequency distribution
    Polygonal graphs
    Population range diagrams
    Scatter diagrams
    Discriminate analysis grouping

13. Writing the research manuscript
    Format, data, graphics
    Publishing a paper
    Rough draft

14. Presentation of research – *Last Class Meeting*
    Poster/PowerPoint guidelines
    Oral presentation guidelines

15. Turn in research paper for grading – *Last Class Meeting*