

RATIONALE AND OBJECTIVES:

Whereas...

1. ...God created the Earth and living organisms which belong to Him (Psalm 24:1), and He has committed the care of these to humans, His stewards (Gen. 1:27-30).
2. ...God ordained that our stewardship be guided, in part, though a science of the order of creation (originating in the mind of God), based upon (a) a system of names (*i.e.* a taxonomy) and (b) a knowledge of the interrelationships within creation (*i.e.* ecology) (Gen. 2:15-20), resulting in better understanding of both the mind of God and our chief end– glorifying God and enjoying Him forever.
3. ...plant taxonomy and ecology both are necessary in modern efforts to identify, understand, and conserve plant species and the biotic communities which they inhabit and support.

It is therefore necessary that students learn to demonstrate KNOWLEDGE of...

1. PLANT IDENTIFICATION – Identify and distinguish plant species based upon morphology from memory or by proficient use of taxonomic keys.
2. PLANT CLASSIFICATION – Assign plant species to an appropriate taxon based upon morphology and discuss challenges to the development of a universally accepted taxonomic system.
3. PLANT ECOLOGY – Associate species as members of a plant community, and to explain how phenotypic and environmental factors influence species survival and distribution.
4. PLANT CONSERVATION – Explain factors that lead to extinction or extirpation of plant species, and how taxonomists and ecologists assist in conserving plant species when habitats are threatened.
5. SPECIMEN & DATA HANDLING – Use acceptable techniques to collect, dissect and study plants under appropriate magnification; and to dry and mount plants for an herbarium collection.
6. DATA MANAGEMENT – Prepare field notes and use a computer database to file and access specimens or digital images; and demonstrate proficiency in accessing and using internet sites and research updates relating to plant taxonomy.

...and demonstrate maturing ATTITUDES/VALUES (affective learning) as observable in the following QUALITY FACTORS characteristic of professional field botanists and taxonomists...

1. Thoroughness in completing both supervised and independent field and laboratory observations, data recording, and herbarium work as evidenced in the quality of completed records and collections.
2. Awareness and respect for plants (including threatened or endangered species as God's creations) and plant communities as life support systems placed under human care. This quality is evidenced in careful attention to plant form and accurate use of descriptive terminology; respect for private property and its owners, and compliance with good stewardship practices in plant collecting.
3. During field studies, observes recommended precautions in the interest of personal safety; and strives for conduct that respects and edifies peers and highlights the grandeur of God's handiwork.

TEACHING APPROACHES and ASSESSMENT:

1. Field and Laboratory Studies provide over 50% of contact hours; emphasis on studying plants within their biotic community; schedules will be altered according to weather; one four-day trip to experience extended field study in another bioregion.
Activities: Observation, “keying”, field journaling, photography, herbarium techniques, database
Assessment: Lab practicals (field and indoor); evaluation of plant collection and field journal
2. Lecture Assignments and Lecture – to provide a conceptual framework in support of field studies
Activities: Readings, assigned problems/questions, class discussion
Assessment: attendance quizzes, graded work, exams (learning supported by field and laboratory)
3. Quality Factors for Learning –see the four “Quality Factors,” bottom page 1.

SCHEDULE: Lecture TR 11:00–11:50 am ENS 240 NOTE: Some lecture periods will be devoted to lab
Laboratory T 2:00 – 4:50 pm ENS 106 work in ENS 106 as noted on the Schedule, page 4.

REQUIRED TEXTS* and SUBSIDIZED RESOURCES**:

*Zach E. Murrell. 2010. *Vascular Plant Taxonomy*, 6th ed. Kendall/Hunt. (i.e Murrell)

*Barnes, B.V. and W.H. Wagner. 1981/2004. *Michigan Trees*. U. of Mich. Press, Ann Arbor. (i.e. BW)

**Newcomb, L. 1977. *Newcomb's Wildflower Guide*. Little, Brown, Co. Boston.

**Field Journal (discount purchase from Science Department), Hand Lens (loaned from Science Dept.)

GRADE CALCULATION:

Weighting:Letter grades:

A = $\geq 92\%$, A- = 90–91.9%, B+ = 88–89.9%, etc.

Exams I and II @15% -----	30%
Lecture Quizzes, Lab Practicals ----	20% -> (Foster commitment to regular study and project completion, p 1.)
Final Exam (Herbarium/Field) -----	10% -> (Lab practical to access proficiency described in Obj. #1, page 1)
Field Journal, Plant Collection-----	30% -> (Graded in 3 installments of increasing pt. value; see p. 4 dates)
Spring Trip and Slides -----	10% -> (Based upon contribution to group and slide show; details page 3)
Total -----	100%

ACADEMIC ASSISTANCE: It is my goal to assist you in every way possible to achieve your academic goals.

If you have special needs for which I should make an allowance, please let me know. You should also inform the [Academic Enrichment Center](#) (“The Cove”), located in the Center for Biblical & Theological Studies Room 218, directed by Mrs. Kim Algrim, to partner with us. For more information, call 937-766-PIER. If you believe you may need support in managing the impact of a disability, please contact Amy Frey in Disability Services section of “The Cove.” My faculty colleagues and I rely on Disability Services to verify the need for academic accommodations and to identify reasonable accommodation strategies. Examples of disabilities are hearing, vision, AD/HD, learning disabilities, psychological, orthopedic, and a health impairment.

ACADEMIC DISHONESTY POLICY is enforced in accordance with the spirit and procedures outlined in the Student Handbook, [Appendix A](#).

TEACHER EDUCATION PROGRAM UNIT AND PROGRAM ASSESSMENTS ASSIGNED TO COURSE

Unit Outcome	Program Outcome	Decision Points	Assessment
Competence	NSTA Std 1a.	4	#1 Content Knowledge
Competence	NSTA Std 1a.	1, 2, 3, 4	#2 Content Knowledge

FIELD JOURNAL and PLANT COLLECTION:

Your most important activity in the field will be learning to observe and identify plants in their native habitats. Your field journal and your plant collection are important, but not ends in themselves. Rather they will help you become more proficient in identifying plants and associating them with plant communities. Collection should begin with a focus on live plants in their niche rather than simply making a notch in your collection "belt" (Silvius, 1990). Your collection will consist of a field journal (FJ) and plant collection (PC) as follows:

FJ. Your field journal will become the written record of your observations made during each field excursion. You are responsible to correctly identify and document at least one hundred (100) species of vascular plants in your field journal. In laboratory you will learn how to register locality, plant community type, plant *Genus* species, family, and distinguishing characteristics. Your written data will provide information necessary to document your collections of actual plant specimens. Journal entries should commence in January with as many as 30 species entries from common trees, shrubs, vines and herbaceous perennials (including cryptogams) recognizable in winter. These entries will be expanded in March as you observe the emergence of spring wildflowers. Specimen collections may include the following:

PC-W. Winter Collection - You will have opportunity to begin your herbarium collection and related techniques by pressing, drying and mounting five (5) plant species in winter form, at least two (2) of which are unique (*i.e.* not in a peer's collection or in CU Herbarium). Specimens may include deciduous woody plants, evergreens (*e.g.* cryptogams, conifers), or dry-standing remains of perennial herbs or grasses.

PC-S. Spring-blooming plant collection (with leaves/reproductive parts mounted on herbarium paper with labels and database entries for each specimen) comprised of five (5) or more non-threatened species of your choice, at least two (2) of which are not already present in the CU Herbarium or database. "New entries" may include corrections of misidentified herbarium specimens or substantially improved or more complete mounts.

PC-P. Photo mounts...up to three (3) species can be represented with high quality printed photos glued to herbarium sheets in place of dried specimens to document vegetative and reproductive characteristics. PC-P species should be unique or uncollectible (see below). Photos must be taken by you or a willing cooperator.

Uncollectible Species are species in any of the following circumstances: (a) observed growing in only one population too small to collect from, (b) encountered areas where collecting is prohibited, (c) listed on the "threatened" or "endangered" species lists. If one of these species duplicates one already in the herbarium it can still count toward one of your two "new entries" within either your PC-W or PC-S specimen total.

Example Collection: A student completes field journal with 106 species documented of which five (5) species are included in (PC-W), four (4) species are mounted as spring-blooming plants (PC-S), and one (1) is represented by photographs on an herbarium sheet (PC-P) to make the total of ten (10) specimens eligible for the CU herbarium.

SPRING TRIP to the Southern Appalachians of TN and NC will expose us to an earlier emergence of the spring flora, provide fellowship in the experience of "mountain living;" allow opportunities for studying latitudinal and altitudinal effects on plant phenology; and provide experience in identifying, collecting, and pressing plant specimens. The trip supports ten percent of the course grade or 100 points, out of which 50 points are based upon attendance/contribution and up to 50 points are awarded for preparation of a slide presentation that presents your choice of theme from the trip (*e.g.* plant phenology, a plant community of your choice). Details of trip itinerary will be forthcoming.

Reference Cited:

Silvius, J.E. 1990. Environmental stewardship in plant collecting: Niche *versus* notch.
American Biology Teacher 52: 112-115.

BIO 3520 – LECTURE AND LABORATORY SCHEDULE
Spring, 2011 [Please Print Study Notes from [BIO 3520 Home Page*](#)]

DATE	Format - Location	TOPIC	Study Assignment**
January 11	Lec. – ENS 240	Introduction	
January 13	Lec. – ENS 240	Activities and Importance of Plant Taxonomy	02 Murrell Ch. 1
January 18	Lec. – ENS 240	What's in a Name? Plant Taxonomy & Stewardship	03 Murrell Ch. 2
January 18	Indoor Lab ENS 106	Woody Plant Morphology – I.D. & Classification	Bring Murrell & BW
January 20	Lec. – ENS 240	Botanical Nomenclature	04 Murrell Ch. 2
January 25	Lec. – ENS 240	Field Journaling Approaches	05
January 25	Fld. Lab ENS 106	Woody Plants - I Field I.D. and Collecting	Bring Murrell & BW
January 27	Lec-Lab – ENS 106	Collecting and Preserving Plant Specimens	06 Murrell Ch. 7
February 1	Lec-Lab – ENS 106	Mounting and Storing Plant Specimens	07 Murrell Ch. 7
February 1	Fld. Lab ENS 106	Woody Plants - II Field I.D. / Collect./ Lab Practical	Bring Murrell & BW
February 3, 8	Lec. – ENS 240	Plant Classification – Approaches and Challenges	08 Murrell Ch 4, 6
February 8	Indoor Lab ENS 106	Ferns and Gymnosperms	Bring Murrell & BW
February 10	Lec-Lab – ENS 106	Ferns and Their Allies	09 Murrell Ch 9
February 15	Lec-Lab – ENS 106	Gymnosperms – Conifers and Others	10 Murrell Ch 10
February 15	Indoor Lab ENS 106	Vegetative Morph. of Flowering Plts; Review Session	[●1 st Jour. grading]
February 17	Exam –ENS 240	Exam I	
February 22	Lec. – ENS 240	Introduction to the Flowering Plants	11 Murrell Ch 11
February 22	Indoor Lab ENS 106	Angiosperms: Floral Morphology, Floral Diagrams	Bring Murrell
Feb. 24, Mar 1	Lec. – ENS 240	Angiosperm Morphology and Classification	Mur. Ch 12-16 Overview
March 1	Un-S Lab ENS 106	Unstructured Lab – Project Work or Released Time	[● PC-W due]
March 3	Lec-Lab – ENS 106	Angiosperm Floral Morphology: Inflorescences	Murrell Ch. 11
March 7 - 11	No Class or Lab	<i>Spring Break</i>	
March 15	Lec. – ENS 240	Angiosperms -- Classification (continued)	Murrell Ch 12-16
March 15	Indoor Lab ENS 106	Angiosperms: Fruit Classif. & Selected Families	Murrell Ch. 11
March 17	Lec. – ENS 240	Baraminology and Discontinuity Systematics	Reading/Handouts
March 22	Lec. – ENS 240	Phenetics and Discontinuity Systematics	
March 22	Indoor Lab ENS 106	Phenetic Analysis Using the BDISTMDS Program	Readings / PC Program
March 24	Lec. – ENS 240	Completion and Exam Review	Ch 11 -16
March 29	Lec. – ENS 240	Exam II	[●2 nd Jour. grading]
March 29	Indoor Lab ENS 106	Grasses, Sedges, Rushes	Assigned Articles
March 31	Lec. – ENS 240	Spring Planning and Exam Discussion	
April 5	Fld. Lab ENS 106	Early Spring Flora – Field Journaling & Plant ID	Cedarville Falls-Mound Pk.
April 7, 12	Lec. – ENS 240	Distinguishing Selected Angiosperm Families	Chapters 11 - 20
April 12	Indoor Lab ENS 106	Planning for “Spring Trip South” (30-40 min only)	
April 14-17	Travel Study	“Spring Trip South into Spring” (Ap 14, noon - Apr 17)	Alt. Date Apr. 21-24 Easter
April 19, 21	Lec– ENS 240	Discussion and Debriefing from Trip	
April 19	Indoor Lab ENS 106	<i>No Lab This Week following Spring Trip</i>	
April 22 - 25	No Fri, Mon. Classes	<i>Easter Break</i>	
April 26, 28	Lec. – ENS 240	Concluding Topics and Review	
April 26	Un-S Lab ENS 106	Unstructured Lab: Complete Herbarium Work	Collection Check-up
May 5, 10:30a	Fld. Lab ENS 106	Final Exam - In-Field and Herbarium Specimens	[● PC-S, P & 3 rd Journal]
May 6, noon	Project Completion	Open Botany Laboratory	Pick Up Journal if Graded

* Subject to change in the event of unforeseen conflicts; changes be announced and will appear in BIO 3520 Home Page version of this schedule.

** Study Assignment to complete before this lecture