

**BOT 6726/ZOO 6927**  
**Principles of Systematic Biology**  
**Spring 2015**

**Instructors:**

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**Office Hours:** By appointment.

**Credits:** 4

**Schedule:** Lecture MWF 3<sup>rd</sup> period (9:35–10:25am) in 222 Carr Hall  
Discussion F 4-5<sup>th</sup> periods (10:40am–12:35pm) in 222 Carr Hall

**Lab manual:** Will be provided as a PDF on Canvas.

**Textbook (required):** Stuessy, Crawford, Soltis, and Soltis. 2014. *Plant Systematics. The Origin, Interpretation, and Ordering of Plant Biodiversity*.

**Other books, not required, but useful (and with assigned readings) include:**

- *Tree thinking: An Introduction to Phylogenetic Biology* by Baum & Smith. Roberts and Co., Publ., Greenwood Village, Colorado. [2013] [Chapters 6, 8, and 10]
- *Phylogenetic Analysis of Morphological Data* by J. J. Wiens (ed.). Smithsonian Institution Press, Washington, D.C. [2000] [Chapter 5]
- *Plant Systematics: A Phylogenetic Approach*, 3<sup>rd</sup> edition by Judd et al. Sinauer Assoc., MA. [2008] [Chapters 1 & 2]
- *Taxonomic analysis in biology: computers, models, and databases* by Abbott et al. Columbia University Press, NY [1985] [Chapter 7, covering phenetic methods]

**Additional readings from the primary literature will be assigned during the semester, and extracts from numerous other articles will be provided as they relate to lecture topics:**

These will be made available on reserve or posted as PDFs on Canvas.

**Grading:** About 60% from exams (two hourly tests) and 40% from the Tau Ceti projects (one presentation and one written report). Grade based on total number of points, with 90% or above an “A”, 89-80% “B”, 79-70% “C”, 69-60% “D”, and below failing; plus grades will be used.

**Outline of lectures and labs  
Spring 2015**

<b>Week 1:</b>		
7 Jan	NC	History of systematics, introduction to cladistics and “tree-thinking, contributions of Darwin and Hennig
9 Jan	NC	Introduction to characters and states, homology decisions, ordering and transformation series, polarity decisions, and rooting methods  <b>LAB:</b> Discussion of characters, alignment, states, etc.
<b>Week 2:</b>		
12 Jan	NC	Conceptual introduction to parsimony
14 Jan	DS	Computerized tree construction, incl. parsimony as an optimization criterion (in molecular and morphological analyses), tree-searching methods, heuristic and branch-and-bound, branch-swapping, addition sequences, etc.
16 Jan	PS	Optimizing character state distributions on trees, ACCTRAN, DELTRAN, trees; continuation of previous lecture.  <b>LAB:</b> Manual cladistics workshop
<b>Week 3:</b>		
19 Jan		UF closed in observance of MLK, Jr. day. No class.
21 Jan	PS	Estimating reliability of phylogenetic trees—modern approaches
23 Jan	DS	Simultaneous and partitioned analyses  <b>LAB:</b> Supertrees (Pam)
<b>Week 4:</b>		
26 Jan	NC	Classification construction and traditional nomenclature
28 Jan	NC	Principles of phylogenetic taxonomy
30 Jan	NC	Phylogenetic nomenclature  <b>LAB:</b> Classification and nomenclature discussion
<b>Week 5:</b>		
2 Feb	PS	Neighbor-joining and UPGMA
4 Feb	ES	Maximum likelihood methods

6 Feb	PS	Bayesian methods <b>LAB:</b> Comparison of parsimony, likelihood, BI, and distance methods
<b>Week 6:</b>		
9 Feb	NC	Introduction to species and speciation
11 Feb	NC	Species concepts
13 Feb	PS	Intraspecific variation <b>LAB:</b> Species discussion (all instructors present)
<b>Week 7:</b>		
16 Feb	DS	Hybridization & polyploidy
18 Feb	ES	Reticulate evolution
20 Feb		<b>Exam on material through Feb 6.</b>
<b>Week 8:</b>		
23 Feb	ES	Gene tree vs. species tree reconciliation
25 Feb	DS	Integrating molecular and morphological analyses
27 Feb	DS	Cytological methods in systematics <b>LAB:</b> Cytology, cont.
<b>Week 9:</b>		
9 Mar	PS	DNA Barcoding
11 Mar	NC	Biogeography
13 Mar	NC	Biogeography, cont. <b>LAB:</b> Tau Ceti workday
<b>Week 10:</b>		
16 Mar	DS	Phylogeography
18 Mar	ES	Divergence time estimation
20 Mar	ES	Divergence time estimation, cont. <b>LAB:</b> Field trip: herbarium (short)

<b>Week 11:</b>		
23 Mar	PS	Co-evolution
25 Mar	PS	Fossils and systematics
27 Mar		Field trip - insect collections (Powell Hall)
<b>Week 12:</b>		
30 Mar	PS	Population genetics, conservation
1 Apr	DS	Phylogeny and developmental evidence (evo-devo)
3 Apr		Field Trip - 3 ranges in FLMNH
<b>Week 13:</b>		
6 Apr	NC	Informatics
8 Apr		Exam in lecture
10 Apr		Tau Ceti workday
<b>Week 14:</b>		
13 Apr	ES	Community Phylogenetics
15 Apr	all	Tau Ceti presentations
17 Apr	all	Tau Ceti presentations
<b>Week 15:</b>		
20 Apr	all	Tau Ceti presentations
22 Apr	all	Tau Ceti presentations