BOT 6726/ZOO 6927
Principles of Systematic Biology
Spring 2017

Instructors:

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- Pam Soltis (301 Dickinson; phone: 273-1964; e-mail: psoltis@flmnh.ufl.edu)
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- Emily Sessa (521 Bartram; phone: 392-1098; e-mail: emilysessa@ufl.edu)

Office Hours: By appointment.

Credits: 4

Schedule:	Lecture	MWF	3rd period (9:35–10:25am) in Carr 222
	Discussion/lab	F	4-5th period (10:40–12:35) in Carr 222

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

Textbook (optional): 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*, 3rd 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:
- Two exams: 25% each
- Tau Ceti: 20% (one presentation and one written report)
- Wikipedia: 20% (draft and final writeup, publication online)
- Participation: 10%

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.

Schedule (subject to change):

4 Jan	NC	Introduction to cladistics and "tree-thinking", contributions of Darwin and Hennig (with definitions of basic terms)
6 Jan	NC	Introduction to characters, homology decisions, states and their delimitation; ordering character states in transformation series; Polarity decisions, the outgroup method; Rooting networks; brief survey of other methods of polarizing characters
	all	**LAB:** Discussion of characters, alignment, states, etc. Introduce Wikipedia project, Tau Ceti.
9 Jan	DS/PS	Tree construction, conceptual introduction to parsimony
11 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.
13 Jan	DS	Optimizing character state distributions on trees, ACCTRAN, DELTRAN, trees; continuation of previous lecture.
	PS	**LAB:** Manual cladistics workshop
16 Jan	—	No Class (MLK Day)
18 Jan	PS	Estimating reliability of phylogenetic trees—modern approaches
20 Jan	DS	Simultaneous and partitioned analyses
	DS/PS	**LAB**: PAUP and manual supertrees
23 Jan	PS	Neighbor-joining and UPGMA
25 Jan	PS	Maximum likelihood methods
27 Jan	PS	Bayesian methods
	DS/PS	**LAB**: Computer lab (parsimony, likelihood, etc.)
30 Jan	NC	Classification construction
1 Feb	NC	Biological nomenclature
3 Feb	NC	Phylogenetic taxonomy
	ES	**LAB**: Classification discussion, Computer lab continued (Bayesian, etc. - Emily)

6 Feb	NC	Intro to species and speciation
8 Feb	NC	Ecological species concept, etc.
10 Feb	PS	Instraspecific variation **LAB**: Species discussion (all instructors present), Wikipedia topic discussion
13 Feb	DS	Hybridization, polyploidy, and reticulation
15 Feb	ES	Gene tree vs. species tree reconciliation
17 Feb	DS/PS	Exam on material through Feb 6.
20 Feb	DS	Phylogeny and developmental evidence (evo-devo)
22 Feb	DS	Integrating molecular and morphological analyses
24 Feb	DS ES	Cytological methods in systematics **LAB**: Cytology, cont., and gene tree/species tree lab (Emily)
27 Feb	ES	Divergence time estimation
1 Mar	ES	Divergence time estimation
3 Mar	ES	Biogeography **LAB**: Wikipedia workday
13 Mar	ES	Biogeography
15 Mar	DS	Phylogeography
17 Mar	ES	Divergence time estimation, cont. **LAB**: Divergence time estimation and biogeography
20 Mar	PS	Co-evolution

22 Mar	PS	Fossils and systematics
24 Mar	PS	Population genetics, conservation, DNA Barcoding
27 Mar	ES	Wikipedia workday
29 Mar	ES	Tau Ceti workday
31 Mar	ES	Community Phylogenetics **LAB**: Community phylogenetics
3 Apr	NC	Informatics
5 Apr	DS/PS	Tau Ceti workday
7 Apr	ES	**Exam in lecture**
10 Apr	all	Wikipedia wrapup
12 Apr	all	Tau Ceti presentations
14 Apr	all	Tau Ceti presentations
17 Apr	all	Tau Ceti presentations
19 Apr	all	Tau Ceti presentations