

Entomology 601 - Fall 2015

Principles of Systematic Entomology

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Course meets MWF, 11:30-12:20, HPCT 210

Course web site: <https://entocourses.tamu.edu/ento601>

Schedule of Lectures

Week 1	Aug 31	1. Introduction. Course goals and procedures.
	Sept 2	2. Folk taxonomies. Historical development of systematics: Greeks through Linnaeus.
	Sept 4	3. Historical development of systematics: Darwin through the Evolutionary Synthesis. Class discussion: Can we (or should we) describe all of the species on earth?
Week 2	Sept 7	4. Concept of the population. Population structure.
	Sept 9	5. The Neodarwinian view of species. Polytypic species and geographic differentiation.
	Sept 11	6. Homology: the central concept in comparative biology. Class discussion: Subspecies vs. species: implications for biodiversity and conservation.
Week 3	Sept 14	7. Character systems: morphology.
	Sept 16	8. Character systems: allozymes, mitochondrial DNA, genetic variation in natural populations.
	Sept 18	9. Character systems: protein-coding DNA Class discussion: What is the role of morphology in contemporary systematic biology?
Week 4	Sept 21	10. Character systems: ribosomal DNA.

	Sept 23	11. Character systems: microsatellites, AFLP markers, SNP's, transcriptomes, phylogenomics
	Sept 25	12. Evolutionary systematics: weighting of characters. Class discussion: Homology and molecular biology
Week 5	Sept 28	13. Phenetic methods: philosophical foundations, definition and coding of characters, measures of distance and association.
	Sept 30	14. Phenetics: clustering algorithms. Ultrametric and non-ultrametric clustering methods
	Oct 2	15. Phenetics: Summary and critique. Class discussion: The future of molecular systematics
Week 6	Oct 5	16. Phylogenetic systematics: philosophical foundations, terminology, cladistic evidence and hypotheses
	Oct 7	17. Phylogenetics: determination of character polarity. First Midterm Examination distributed.
	Oct 9	18. Phylogenetics: resolution of conflicting data, the parsimony criterion. Class discussion: DNA "bar-coding"
Week 7	Oct 12	19. Phylogenetics: tree-building algorithms.
	Oct 14	20. Phylogenetics: Parsimony methods First Midterm due by email (no later than COB, 5:00 pm).
	Oct 16	21. Phylogenetics: Maximum likelihood methods. Class discussion: Character optimization and evolution of traits
Week 8	Oct 19	22. Phylogenetics: Bayesian methods
	Oct 21	23. Gene trees, species trees, coalescence theory, and concatenation of data
	Oct 23	24. Phylogenetics: Assessing the quality of data and robustness of results. Class discussion: Concatenation of data vs. separate analyses and

		reconciliation
Week 9	Oct 26	25. Phylogenetics: Applying the results in classification, ranking of taxa, evolutionary systematics revisited.
	Oct 28	26. Phylogenetics: conclusions.
	Oct 30	27. Introduction to speciation theory, allopatric speciation. Class discussion: bootstrap resampling and clade support
Week 10	Nov 2	28. Semispecies, ring species and related problems.
	Nov 4	29. Species concepts: biological, phenetic, recognition. Second Midterm Examination distributed.
	Nov 6	30. Parthenogenesis, species concepts in the absence of sexual reproduction. Class discussion: Is there a place for paraphyletic taxa?
Week 11	Nov 9	31. Sympatric speciation and host-associated differentiation.
	Nov 11	32. A case study in speciation: the Hawaiian <i>Drosophila</i> . Second Midterm Examinations due (email only, by COB).
	Nov 13	33. Hybrid zones, species boundaries, parapatric speciation Class discussion: host-associated differentiation
Week 12	Nov 16	Class cancelled, ESA meetings in Minneapolis
	Nov 18	Class cancelled, ESA meetings in Minneapolis
	Nov 20	34. Lineage-based species concepts. Class discussion: Species concepts
Week 13	Nov 23	35. Zoological Nomenclature 1
	Nov 25	Reading Day: No Classes
	Nov 27	Thanksgiving Holiday
Week 14	Nov 30	36. Zoological Nomenclature 2
	Dec 2	37. Zoological Nomenclature 3

		Final Examination distributed.
	Dec 4	38. Biodiversity Informatics Class discussion: The future of taxonomic publication
Week 15	Dec 7	Redefined Day: attend Friday classes 39. Applications of systematics: study of coevolution and adaptation, the “comparative method”.
	Dec 9	Last Day of Classes, Fall Semester Class discussion: course critique, open discussion of any topics of interest
Friday	Dec 11	Final Examinations Due electronically by 5:00 pm.

Office Hours:

SCSE (Minnie Bell Heep Bldg.) 305 (office), 311 (lab)
Mon, Wed, Fri, 9:00-11:00 am, or by appointment.

Readings:

There is no single assigned text for this course. We will use a variety of texts, review papers, and papers from the primary literature. I will do my best to make pdf copies of the reading available to you on the course web site well ahead of the days they are assigned (but I can't always be successful with this). Copies of Powerpoint files used in lecture will also be available on the web site.

Class Discussion:

Each **Friday** we will devote the last 20 minutes or so of class to a discussion relevant to that week's lectures. Background reading for the discussion will be posted on the course web site. Depending on how these discussions go, I may assign a different person to lead each discussion.

Examinations:

Two midterms and one final examination are scheduled as noted above. The examinations will be "take home" in format. You will have one week to complete each take-home exam. The examinations will consist primarily of essay questions, and they will require synthesis of material discussed in lecture or assigned as readings. They will be similar to the sorts of questions that many of us ask in Ph.D. written exams.

Course Grading:

- 10% Class Participation and Discussions
- 25% First Examination
- 30% Second Examination
- 35% Final Examination

Remarks:

Class periods will combine lectures and discussions of the current topic. Please initiate these discussions whenever you have a question or problem with the material (someone else almost certainly does too), or whenever you have something to contribute. If you can't get my attention immediately, be persistent or noisy, that usually works. Note that 10% of the grade will be determined by participation in lecture discussions. Thus, it is to your advantage to have read the assigned materials prior to the lectures. In any case, you will find reading all of the assigned material during exam weeks to be burdensome.

Americans With Disabilities Act

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If a student believes he or she has a disability requiring an accommodation, he or she should contact the Office of Support Services for Students With Disabilities in Room 126 of the Koldus Building (845-1637) so that such accommodation can be made.

Class Attendance

Student rules governing class attendance can be found on the Texas A&M University Website, under Student Rules 2002-2003 at <http://student-rules.tamu.edu/> .

Plagiarism.

As commonly defined, plagiarism consists of passing off as one's own the ideas, words, writings etc. which belong to another person. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have the permission of that person. Plagiarism is one of the worst academic sins, for the plagiarist destroys the trust among colleagues without which research cannot be safely communicated. Conclusive evidence of plagiarism on an exam will result in an automatic zero grade for the exam.

If you have any questions regarding plagiarism, please consult the latest issue of the *Texas A&M University Student Rules*, under the section "Scholastic Dishonesty".

Academic Integrity

"An Aggie does not lie, cheat or steal, or tolerate those that do".

Further information on the Rules and Procedures of the Honor Council can be found at <http://www.tamu.edu/aggiehonor>.

Campus Emergency Information

I have been asked to make you aware of the following emergency phone numbers:

Police/Fire/Medical Emergencies: Dial 911 if Off-Campus or using a cell phone, dial 9-911 if using a campus phone.

University Police, non-emergency: 979-845-2345

Poison Control: 1-800-222-1222