

Submit originals (including syllabus) and one copy and electronic copy to the **Faculty Senate Office**
 See <http://www.uaf.edu/uafgov/faculty-senate/curriculum/course-degree-procedures/> for a complete description of the rules governing curriculum & course changes.

CHANGE COURSE (MAJOR) and DROP COURSE PROPOSAL
 Attach a syllabus, except if dropping a course.

SUBMITTED BY:

Department	Museum / Bio Wildlife	College/School	CNSM
Prepared by	Derek Sikes	Phone	474-6278
Email Contact	dssikes@alaska.edu	Faculty Contact	Derek Sikes

1. COURSE IDENTIFICATION: As the course now exists.

Dept	Bio	Course #	615	No. of Credits	3
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COURSE TITLE	Systematic and Comparative Biology
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2. ACTION DESIRED: ☒ Check the changes to be made to the existing course.

Change Course	<input checked="" type="checkbox"/>	If Change, indicate below what is changing.	Drop Course	<input type="checkbox"/>
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NUMBER		TITLE		DESCRIPTION	<input checked="" type="checkbox"/>
PREREQUISITES*				FREQUENCY OF OFFERING	

*Prerequisites will be required before a student is allowed to enroll in the course.

CREDITS (including credit distribution)	x	COURSE CLASSIFICATION	
STACKED (400/600)		Dept.	
Include syllabi.		Course #	

Stacked course applications are reviewed by the (Undergraduate) Curricular Review Committee and by the Graduate Academic and Advising Committee. Creating two different syllabi—undergraduate and graduate versions—will help emphasize the different qualities of what are supposed to be two different courses. The committees will determine: 1) whether the two versions are sufficiently different (i.e. is there undergraduate and graduate level content being offered); 2) are undergraduates being overtaxed?; 3) are graduate students being undertaxed? In this context, the committees are looking out for the interests of the students taking the course. Typically, if either committee has qualms, they both do. More info online - see URL at top of this page.

ADD NEW CROSS-LISTING		Dept. & No.		Requires approval of both departments and deans involved. Add lines at end of form for additional signatures.
STOP EXISTING CROSS-LISTING		Dept. & No.		Requires notification of other department(s) and mutual agreement. Attach copy of email or memo.
OTHER (specify)	Based on student feedback I want to add a lab to the course.			

3. COURSE FORMAT

NOTE: Course hours may not be compressed into fewer than three days per credit. Any course compressed into fewer than six weeks must be approved by the college or school's curriculum council and the appropriate Faculty Senate curriculum committee. Furthermore, any core course compressed to less than six weeks must be approved by the core review committee.

COURSE FORMAT: (check <u>all</u> that apply)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input checked="" type="checkbox"/> 6 weeks to full semester
OTHER FORMAT (specify all that apply)	Full Fall semester graduate level course					
Mode of delivery (specify lecture, field trips, labs, etc.)	3 lectures/wk, + one 3h lab/wk					

RECEIVED

SEP 20 2013

Dean's Office
 College of Natural Science & Mathematics

Governance
 10/3/13 TR

4. **COURSE CLASSIFICATIONS:** (undergraduate courses only. Use approved criteria found on Page 10 & 17 of the manual. If justification is needed, attach on separate sheet.)

H = Humanities

S = Social Sciences

Will this course be used to fulfill a requirement for the baccalaureate core?

YES

NO

X

IF YES*, check which core requirements it could be used to fulfill:

O = Oral Intensive,

W = Writing Intensive,

Natural Science,

*Format 6 also submitted

*Format 7 submitted

*Format 8 submitted

- 4.A Is course content related to northern, arctic or circumpolar studies? If yes, a "snowflake" symbol will be added in the printed Catalog, and flagged in Banner.

YES

NO

X

5. **COURSE REPEATABILITY:**

Is this course repeatable for credit?

YES

NO

X

Justification: Indicate why the course can be repeated (for example, the course follows a different theme each time).

How many times may the course be repeated for credit?

TIMES

If the course can be repeated with variable credit, what is the maximum number of credit hours that may be earned for this course?

CREDITS

6. **COMPLETE CATALOG DESCRIPTION** including dept., number, title, credits, credit distribution, cross-listings and/or stacking, clearly showing the changes you want made. (Underline new wording ~~strike through old wording~~ and use complete catalog format including dept., number, title, credits and cross-listed and stacked.)

Example of a complete description:

PS F450 Comparative ~~Aberiginal~~ Indigenous Rights and Policies (s)

3 Credits

Offered As Demand Warrants

~~Case-study~~ Comparative approach in assessing ~~Aberiginal~~ to analyzing Indigenous rights and policies in different nation-state systems. ~~Seven Aberiginal situations~~

Multiple countries and specific policy developments examined for factors promoting or limiting self-determination. Prerequisites: Upper division standing or permission of instructor. (Cross-listed with ANS F450.) (3+0)

BIOL F615

Systematic and Comparative Biology

~~3~~ 4 Credits

Offered Fall Even-numbered Years

Concepts of systematic biology basic to a rigorous and complete understanding of modern evolutionary theory. Systematics provides the historical framework critical to a variety of comparative analyses in biology. Recent innovations in phylogenetic analyses will be explored in lecture and lab.

Prerequisites: Graduate standing in biology or permission of instructor (3+03)

7. **COMPLETE CATALOG DESCRIPTION AS IT SHOULD APPEAR AFTER ALL CHANGES ARE MADE:**

BIOL F615

Systematic and Comparative Biology

4 Credits

Offered Fall Even-numbered Years

Concepts of systematic biology basic to a rigorous and complete understanding of modern evolutionary theory. Systematics provides the historical framework critical to a variety of comparative analyses in biology. Recent innovations in phylogenetic analyses will be explored in lecture and lab.

Prerequisites: Graduate standing in biology or permission of instructor (3+3)

8. **GRADING SYSTEM:** Specify only one.

LETTER:

X

PASS/FAIL:

9. **ESTIMATED IMPACT**

WHAT IMPACT, IF ANY, WILL THIS HAVE ON BUDGET, FACILITIES/SPACE, FACULTY, ETC.

Currently the course was being taught so that 1 lecture period was used as a computer lab period/lecture. The change would increase the use of the computer lab from 1h/wk to 3h/wk.

10. **LIBRARY COLLECTIONS**

Have you contacted the library collection development officer (kljensen@alaska.edu, 474-6695) with regard to the adequacy of library/media collections, equipment, and services available for the proposed course? If so, give date of contact and resolution. If not, explain why not.

No

No

Yes

Students need use only standard library resources of online journals.

11. **IMPACTS ON PROGRAMS/DEPTS:**

What programs/departments will be affected by this proposed action? Include information on the Programs/Departments contacted (e.g., email, memo)

Only my own workload within the Biology and Wildlife department will be affected. I've attached an email from the former Dept. Chair, Christa Mulder, who agrees with this.

12. **POSITIVE AND NEGATIVE IMPACTS**

Please specify **positive** and **negative** impacts on other courses, programs and departments resulting from the proposed action.


Adding a lab would improve this course and therefore help any other courses that benefit from students trained in systematics. The only negative would be the required use of a computer lab for 3h/week.


13. **JUSTIFICATION FOR ACTION REQUESTED**

The purpose of the department and campus-wide curriculum committees is to scrutinize course change and new course applications to make sure that the quality of UAF education is not lowered as a result of the proposed change. Please address this in your response. This section needs to be self-explanatory. If you ask for a change in # of credits, explain why; are you increasing the amount of material covered in the class? If you drop a prerequisite, is it because the material is covered elsewhere? If course is changing to stacked (400/600), explain higher level of effort and performance required on part of students earning graduate credit. Use as much space as needed to fully justify the proposed change and explain what has been done to ensure that the quality of the course is not compromised as a result.

This change is in response to student feedback from course evaluations. It would improve the course to add a formal 3h lab and additional lecture time would be freed to allow more discussion of readings of primary literature which was another student evaluation request (that more time be devoted to readings discussions).

APPROVALS: (Additional signature blocks may be added as necessary.)

		Date	9/19/2013
Signature, Chair, Program/Department of:		Biology + Wildlife	

		Date	10-1-13
Signature, Chair, College/School Curriculum Council for:		CNSM	

		Date	10/12/13
Signature, Dean, College/School of:		CNSM	

Offerings above the level of approved programs must be approved in advance by the Provost:

		Date	
Signature of Provost (if applicable)			

ALL SIGNATURES MUST BE OBTAINED PRIOR TO SUBMISSION TO THE GOVERNANCE OFFICE.

		Date	
Signature, Chair			
Faculty Senate Review Committee: <input type="checkbox"/> Curriculum Review <input type="checkbox"/> GAAC			
<input type="checkbox"/> Core Review <input type="checkbox"/> SADAC			

ADDITIONAL SIGNATURES: (As needed for cross-listing and/or stacking; add more blocks as necessary.)

		Date	
Signature, Chair, Program/Department of:			

		Date	
Signature, Chair, College/School Curriculum Council for:			

		Date	
Signature, Dean, College/School of:			

Note: If removing a cross-listing, attach copy of email or memo to indicate mutual agreement of this action by the affected department(s). If degree programs are affected, a Format 5 program change form must also be submitted.

Systematic and Comparative Biology

Fall 2014

Biol 615 (4 credits) CRN = 74110

Instructor: Derek S. Sikes

Museum

474-6278

dssikes@alaska.edu

Website: <https://classes.uaf.edu/webapps/login> (Blackboard)

Office Hours: Wednesdays 12-1, Museum (or by appt.)

Lectures: Museum classroom (151), Monday, Wednesday, Friday 9:15-10:15

Lab: TBD 3h

Required Textbook: The Phylogenetic Handbook: A Practical Approach to Phylogenetic Analysis and Hypothesis Testing, Salemi, M. and Vandamme, A.-M. (eds). Cambridge Univ. Press., 2nd Edition (2009). Additional required papers will be available via Blackboard.

Course description: Concepts of systematic biology basic to a rigorous and complete understanding of modern evolutionary theory. Systematics provides the historical framework critical to a variety of comparative analyses in biology. Recent innovations in phylogenetic analyses will be explored in lecture and lab. The methods covered apply equally to all eukaryotic taxa, based on either morphological or molecular characters. Training in key software packages will take place in lab. Some of the topics and methods covered:

Taxonomy. Species demarcation / concepts, phylogeography, description / diagnosis, naming, rules of nomenclature, DNA barcoding, the "taxonomic bottleneck," digitization of taxonomic data / bioinformatics, homology / characters (alignment 1)

Phylogenetics. History & development, Phenetics, Cladistics, homology of sequences (alignment 2), taxon and character sampling, distance methods, parsimony, maximum likelihood, Bayesian, MCMC, model selection, branch support, ancestral state reconstruction, divergence dating, biogeography, fossil data, trouble-shooting, species trees.

Course prerequisites: Graduate standing in Biology or by permission of instructor

Note: Offered Alternate Fall. Recommended: Mathematical Modeling, Math 660.

Course instruction will consist of 1h lectures 3x a week, a weekly 3h lab, textbook and lab readings, and classroom discussion. Expect to spend 6h per week preparing and reading outside of class.

Goals of the course: Students successfully completing the course should be able to evaluate the quality of, and know how to produce, both traditional taxonomic and statistical phylogenetic studies.

Student learning outcomes: Students will learn how to describe a new species using both morphological and molecular methods and will learn the rules of the International Code of Zoological Nomenclature. Students will learn how to estimate the phylogeny of a group of taxa or populations using various marker systems and analytical methods.

Instructional methods: lecture, lab, group discussion of primary literature, preparation of an project involving a phylogenetic analysis.

Evaluation: The course grade will be based on the following:

Component	Proportion of grade
Lab & take home exercises	25%
Midterm exam	20%
Project	20%
Final exam (cumulative in part)	30%
Participation	5%

A +	96.7 - 100 %	C +	76.7 - 79 %
A	93.4 - 96.6 %	C	73.4 - 76.6 %
A -	90 - 93.3 %	C -	70 - 73.3 %
B +	86.7 - 89 %	D +	66.7 - 69 %
B	83.4 - 86.6 %	D	63.4 - 66.6 %
B -	80 - 83.3 %	D -	60 - 63.3 %
		F	< 60%

Bonus: 5% bonus points are available. Simply write down 5 of your best questions asked of me during lecture *and their answers* and submit this list during the first week of December. If I agree they are good questions (beneficial to the course goals) each will be worth 1% extra towards your grade. All will be posted on Blackboard as a group study aid before the final exam.

Project: Write one 15-25 page scientific manuscript that is: (1) a review or re-analysis of published phylogenetic data, (2) analyzes new character data collected in your research, or (3) considers conceptual and theoretical issues in phylogenetic systematics. The manuscript should be based on work that is not already completed, and it should be prepared for publication in a peer-reviewed journal. The target journal should be identified, and the manuscript should be formatted to conform to journal guidelines. Manuscripts will be "peer-reviewed" by the class and submitted to your instructor for final "editorial" review and grading on the last day of class. Note: the peer-reviewed copy must be turned in with the final version.

Plagiarism: "Plagiarism is the overt or covert use of other people's work or ideas without acknowledgement of the source. This includes using ideas or data from a classmate or colleague without permission and acknowledgement, including sentences from journal articles (either in their entirety or with minor changes) in your writing without citing the author, or copying parts of a website into your essay. You cannot use someone's ideas without citing the originator; you cannot use someone's words without quoting the writer. Any deviation from this will be regarded as plagiarism.

When you plagiarize you are stealing the currency which science (and many other endeavors) uses: knowledge. Plagiarism and cheating are serious offenses that violate the student code of conduct may result in an "F" in the course and / or referral to the university disciplinary committee." (Mulder, Biol. 693-03, 2009 syllabus).

When in doubt – cite it!

Note for students with disabilities: If you have a disability of any kind for which you think you may need an adjustment in the classroom, you must contact the Office of Disability Services (203 WHIT, 474-7043). I will work with the office to provide reasonable accommodation, but I require a letter from this office.

Course Calendar

<u>DATE</u>		<u>LECTURE TOPIC</u>	<u>READINGS</u>
Aug	31(f)	lec. 1. Introduction to biological systematics (value)	See website
Sep	3(m)	Labor Day, no classes	
	5(w)	lec. 2. Introduction continued; History of taxonomy	
	7(f)	lec. 3. Discussion of readings	
	(tbd)	lab. 1. – taxonomy on the web (web exercise)	
	10(m)	lec. 4. Species & taxonomy	
	12(w)	lec. 5. Nomenclature & Classification	
	14(f)	lec. 6. Discussion of readings	
	(tbd)	lab. 2. – taxonomic literature (& nomenclature exercise)	
	17(m)	lec. 7. Specimens, collections, curation	
	19(w)	lec. 8. Modern Taxonomy – DNA barcodes, etc.	
	21(f)	lec. 9. Discussion of readings	
	(tbd)	lab. 3. - beetle exercise: finding characters; descriptions and diagnoses	
	24(m)	lec. 10. Phylogenetic inference – history / introduction	
	26(w)	lec. 11. Homology	
	28(f)	lec. 12. Discussion of readings	
	(tbd)	lab. 4. - beetle exercise: keys	
Oct	1(m)	lec. 13. Molecular homology, alignment	
	3(w)	lec. 14. Trees - Parsimony	
	5(f)	lec. 15. Discussion of readings	
	(tbd)	lab. 5. – Alignment, Clustal: Data (Beetle assignment due)	
	8(m)	lec. 16. Distance methods	
	10(w)	lec. 17. Large datasets – heuristic searching	
	12(f)	lec. 18. Discussion of readings	
	(tbd)	lab. 6. – Introduction to PAUP* I: Distances & Parsimony	
	15(m)	MIDTERM EXAM	
	17(w)	lec. 19. Models, correcting data, model choice	
	18(f)	lec. 20. Discussion of readings	
	(tbd)	lab. 7. – PAUP* II	
	22(m)	lec. 21. Maximum Likelihood	
	24(w)	lec. 22. Accuracy & performance	

	26(f) (tbd)	lec. 23. Discussion of readings lab. 8. – Model Choice
	29(m) 31(w) 2(m) (tbd)	lec. 24. MP & ML continued, assessment, tree confidence lec. 25. Assessment, tree confidence: Consensus, bootstrap lec. 26. Discussion of readings lab.9. Lab –bootstrapping, decay values
Nov	5(m) 7(w) 9(f) (tbd)	lec. 27. Bayesian Phylogenetic Inference 1 lec. 28. Bayesian Phylogenetic Inference 2 lec. 29. Discussion of readings lab. 10. – MrBayes
	12(m) 14(w) 16(f) (tbd)	lec. 30. Bayesian Inference 3 & Ancestral state reconstruction lec. 31. Ancestral state reconstruction 2 lec. 32. Discussion of readings lab. 11. – work on projects or optional ACSR labs
	19(m) 21(w) 23(f)	lec. 33. Troubleshooting Phylogenies lec. 34. Molecular Divergence Dating lec. 35. Discussion of readings Thanksgiving break
	26(m) 28(w) 30(f) (tbd)	lec. 36. New Uses for New Phylogenies lec. 37. Fossils and Phylogenies lec. 38. Discussion of readings lab. 12. – work on projects or Optional Divergence Dating lab
Dec	3(m) 5(w) 7(f) (tbd)	lec. 39. Recent methods - Species Trees lec. 40. Next Gen Sequencing & Systematics [Ickert-Bond] lec. 41. Discussion of readings lab. 13. – work on projects
	10(m) 12(w)	lec. 42. Journal Article Discussion - read 8-10 AM FINAL EXAM