

Submit original with signatures + 1 copy + electronic copy to Faculty Senate (Box 7500).  
See <http://www.uaf.edu/uafgov/faculty-senate/curriculum/course-degree-procedures/> for a complete description of the rules governing curriculum & course changes.

**TRIAL COURSE OR NEW COURSE PROPOSAL**

**SUBMITTED BY:**

Department	Biology & Wildlife	College/School	CNSM
Prepared by	Falk Huettmann	Phone	907 474 7882
Email Contact	fhuettmann@alaska.edu	Faculty Contact	Falk Huettmann

1. ACTION DESIRED (CHECK ONE): Trial Course ☐ New Course ☒

2. COURSE IDENTIFICATION: Dept B&W Course # WLF 6XX No. of Credits 3

Justify upper/lower division status & number of credits:

3 credits are based on required skill and topics taught, such as applied Eco-Informatics dealing with modern biological and wildlife schemes (e.g. taxonomy, environmental information, data, metadata, sensors, and ecosystem management based on R, cloud computing and online applications)

3. PROPOSED COURSE TITLE: Eco-Informatics

4. To be CROSS LISTED? YES/NO No If yes, Dept: Course #

(Requires approval of both departments and deans involved. Add lines at end of form for additional required signatures.)

5. To be STACKED? YES/NO No If yes, Dept: 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.

6. FREQUENCY OF OFFERING: As needed, one per fall every second year  
Fall, Spring, Summer (Every, or Even-numbered Years, or Odd-numbered Years) - or As Demand Warrants

7. SEMESTER & YEAR OF FIRST OFFERING (AY2013-14 if approved by 3/1/2013; otherwise AY2014-15) Fall 2013 or later

**8. 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. Furthermore, any core course compressed to less than six weeks must be approved by the core review committee.

COURSE FORMAT: (check all that apply) ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ 6 weeks to full semester

OTHER FORMAT (specify)

Mode of delivery (specify lecture, field trips, labs, etc) Lecture, labs

**RECEIVED**

SEP 18 2012

Dean's Office

College of Natural Science & Mathematics

Leah Berman  
9/19/12 TUP

Governance

10/3/12 TUP



Fall, Spring, Summer (Every, or Even-numbered Years, or Odd-numbered Years) — or  
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COURSE FORMAT:  
(check all 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"/>	x	6 weeks to full semester
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OTHER FORMAT (specify)

Mode of delivery (specify  
lecture, field trips, labs, etc)

Lecture, labs

**9. CONTACT HOURS PER WEEK:**

2

LECTURE  
hours/weeks

3

LAB  
hours /week

PRACTICUM  
hours /week

Note: # of credits are based on contact hours. 800 minutes of lecture=1 credit. 2400 minutes of lab in a science course=1 credit. 1600 minutes in non-science lab=1 credit. 2400-4800 minutes of practicum=1 credit. 2400-8000 minutes of internship=1 credit. This must match with the syllabus. See <http://www.uaf.edu/uafgov/faculty-senate/curriculum/course-degree-procedures-/guidelines-for-computing/> for more information on number of credits.

OTHER HOURS (specify type)



10. **COMPLETE CATALOG DESCRIPTION** including dept., number, title, credits, credit distribution, cross-listings and/or stacking (50 words or less if possible):

Example of a **complete** description:

FISH F487 W, O Fisheries Management

3 Credits Offered Spring

Theory and practice of fisheries management, with an emphasis on strategies utilized for the management of freshwater and marine fisheries. *Prerequisites:* COMM F131X or COMM F141X; ENGL F111X; ENGL F211X or ENGL F213X; ENGL F414; FISH F425; or permission of instructor. Cross-listed with NRM F487. (3+0)

BIOL 6XXX Eco-Informatics

3 Credits Offered Fall

The discipline of Ecology has greatly progressed last decades, and so has Informatics. Ecosystem-based Management of Wildlife and Habitats represents the scheme of the day, and data, computing and the internet offer great opportunities to advance such an ecology, management and sustainability world-wide. This course will provide required skills for computational and online applications in the discipline of Wildlife and Habitat Ecology. Following an inquiry-based approach it will provide the core themes of Eco-Informatics. *Prerequisites:* Undergraduate course in ecology or wildlife management, e.g. for UAF students BIOL 271 'Principles of Ecology', WLF201 'Principles of Wildlife Management', BIOLF469/F669 'Landscape Ecology and Wildlife Habitat', good graduate standing or permission of instructor is required. Knowledge about Statistics (e.g. STAT 200, 300 or 401), related software and R skills would be an asset but not really necessary. (2+3)

11. **COURSE CLASSIFICATIONS:** Undergraduate courses only. Consult with CLA Curriculum Council to apply S or H classification appropriately; otherwise leave fields blank.

H = Humanities

S = Social Sciences

Will this course be used to fulfill a requirement for the baccalaureate core? If YES, attach form.

YES:

NO:

No

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

O = Oral Intensive, Format 6

No

W = Writing Intensive, Format 7

No

Natural Science, Format 8

Yes

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

"snowflake" symbol

YES

yes

NO

12. **COURSE REPEATABILITY:**

Is this course repeatable for credit?

YES

NO

No

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 for credit, what is the maximum number of credit hours that may be earned for this course?

CREDITS

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

**13. GRADING SYSTEM:** Specify only one. Note: Later changing the grading system for a course constitutes a Major Course Change.

LETTER:

X

PASS/FAIL:

**RESTRICTIONS ON ENROLLMENT (if any)**

**14. PREREQUISITES**

Undergraduate course in ecology or wildlife management, e.g. for UAF students BIOL 271 'Principles of Ecology', WLF201 'Principles of Wildlife Management', BIOLF469/F669 'Landscape Ecology and Wildlife Habitat', good graduate standing or permission of instructor is required. Knowledge about Statistics (e.g. STAT F200, 401 or F300), related software and R is an asset, but not really necessary.

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

Reference the registration implications below due to Banner coding of these terms:

Prerequisite: Course completed and grade of "C" (2.0) or higher prior to registering for the course that requires it.

Concurrent: Course may be taken simultaneously (and allows for a course to have been previously completed).

Co-requisite: Courses MUST be taken simultaneously and does NOT allow for fact that a course was previously completed!

**15. SPECIAL RESTRICTIONS, CONDITIONS**

This course will primarily focus on IBM PC computers; students using MACs might have to resolve technical problems on their own.

**16. PROPOSED COURSE FEES**

None

Has a memo been submitted through your dean to the Provost for fee approval?

Yes/No

**17. PREVIOUS HISTORY**

Has the course been offered as special topics or trial course previously?

Yes/No

Yes



If yes, give semester, year, course #, etc.:

fall 2009, WLF F693

### 18. ESTIMATED IMPACT

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

Regular computing lab

### 19. 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

Yes

Yes

Anne Christie (Bio Library) has been contacted

### 20. 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)

Usual regular workload for a 3 credit class, use of computing facilities (PC-based, R, www)

### 21. POSITIVE AND NEGATIVE IMPACTS

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

**This class will provide skills needed to succeed in the discipline of Eco-Informatics. This discipline presents front-end science applications and helps to bring students to that level.**  
**I cannot see negative impacts.**

### 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. Use as much space as needed to fully justify the proposed course.

There are currently very few class offerings of this sort anywhere.

This class was already taught successfully in fall 2009.

Here I would like to make it permanent, and move it into the regular curriculum. I do that because we lack such offerings at UAF, in the state of Alaska, for the Arctic and elsewhere. Secondly, this class I can teach in the alternating years and when Ornithology and Landscape Ecology is not offered (as was the case in fall 2009).

Based on my own science work worldwide and from what I see and read, I find a huge niche for such class and its skills (I teach several components of Eco-Informatics already elsewhere and get frequently invited for doing so).



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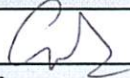
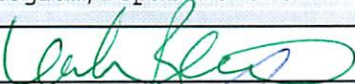
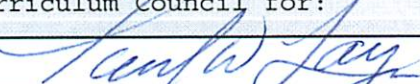
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APPROVALS: Add additional signature lines as needed.

	Date	Sept 18, 2012
Signature, Chair, Program/Department of:	Bot and Wildlife	
	Date	28 Sept 2012
Signature, Chair, College/School Curriculum Council for:	CNSM	
	Date	10/1/12
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 above level of approved programs)		

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)

	Date	
Signature, Chair, Program/Department of:		
	Date	
Signature, Chair, College/School Curriculum Council for:		

	Date	
Signature, Dean, College/School of:		

**Eco-Informatics**  
**WLF6XX (Fall 2013)**  
(version 27th September 2012)

**Instructor:** Falk Huettmann PhD      Office: 419 IAB (Irving I)  
**Phone:** 474 7882      E-mail: fhuettmann@uaf.edu  
**Office hours:** 10:15 a.m. – 12:15 pm on Wednesday

**TA:** TBA

**Lecture:** Monday and Wednesday 10:30 – 11:35 a.m., 207 Irving 1  
**Lab:** Friday 14:15 p.m. - 17:15 p.m., 103 Irving 1

**Course Web Page:** <http://courses.uaf.edu>

**Course Description:** The discipline of Ecology has greatly progressed last decades, and so has Informatics. Ecosystem-based Management of Wildlife and Habitats represents the scheme of the day, and data, computing and the internet offer great opportunities to advance such an ecology, management and sustainability world-wide. This course will provide required skills for computational and online applications in the discipline of Wildlife and Habitat Ecology. Following an inquiry-based approach it will provide the core themes of Eco-Informatics.

**Course Goals:** Students will learn modern core principles and techniques of Eco-Informatics and be able to know and apply relevant details. Specifically, successful students are able to operate in basic terms R, SQL databases, basic data mining and machine learning algorithms, digital taxonomic databases, Genbank, FGDC ISO metadata (xml), MARXAN, iBUTTONs, GIS and cloud computing. Also, fundamental and hands-on skills for GBIF, AKGAP and IPCC data, as well as Uni of Alaska Museum (ARCTOS), LTER, USGS and UAF servers, and library archives will be obtained.

**Pre-requisites:** Undergraduate course in ecology or wildlife management, e.g. for UAF students BIOL 271 'Principles of Ecology', WLF201 'Principles of Wildlife Management', BIOLF469/F669 'Landscape Ecology and Wildlife Habitat', good graduate standing or permission of instructor is required. Knowledge about Statistics (e.g. STAT F200, 401 or F300), Knowledge about Statistics (e.g. STAT 200, 300 or 401), related software and R skills would be an asset but not really necessary.

**Credits:** 3

**Grading Policy:** Letter grades will be determined from the performance in labs (25%: attendance, paper discussion, performance test), several quizzes (8%), one midterm (12%), two term projects (20%; database project, data mining) and one final exam (35%). The two exams will be based on 15 multiple-choice and 5 qualitative questions. The labs



will involve computing applications that require pass/fail and 4 lab assignments with short written reports and metadata (handed in digitally). The projects should cover a specific question involving Ecology and Informatics, and set the stage for an 'embedded data publication' (details to be discussed with the instructor). I can offer extra credits. I expect motivated, professionally behaving and fast thinking students because this course involves advanced technology and learning many software packages for real-world applications. Students are also required to fully collaborate, appear punctual to lectures/labs and assignments, attend all laboratories, and hand in assignments in time. Students missing lectures, labs and assignments may be subject to FIW.

Note: This course will make use of (public) software, extensive data sets and advanced data mining techniques. Inquiry-based approaches at the internet and data investigations are promoted. Be prepared to receive a professional editorial review on your digital work and via email and Blackboard. Late assignments will receive a grade of 0. Special arrangements or a doctor's evaluation of illness are required to make up a test or other assignment. I reserve the right to add additional tests, quizzes or assignments if students do not come to lecture and lab prepared. I reserve also the right to curve tests if I deem this appropriate. You are expected to do your own work in accordance with the UAF Student Code of Conduct (<http://www.uaf.edu/catalog/current/academics/regs3.html>). Cheating and plagiarism are very serious offenses, and will not be tolerated. Any exam or paper that contains plagiarized material will receive a grade of zero. Be sure you understand what constitutes plagiarism and cheating (see below for help on this). Any student who turns in a paper not written by him/herself (such as purchased from a company or downloaded from the Internet) will flunk the entire course. The Rasmuson Library has prepared materials to help you better understand how to properly cite sources. For an explanation of what constitutes plagiarism see: <http://www.uaf.edu/library/instruction/handouts/Plagiarism.html>. For an explanation of how to properly cite sources see: <http://www.uaf.edu/library/instruction/handouts/Citing.html>. Any details presented in this course outline can be subject to change.

Readings: The course will closely follow the standard journal reference:

Biodiversity Informatics <https://journals.ku.edu/index.php/jbi>

Recommended Books (referred to in lectures, labs and assignments. Not required; but for the interested student):

- Braun, C. E. 2005. Techniques for Wildlife Investigations and Management. The Wildlife Society (TWS), Bethesda, Maryland USA.
- Curry, G.B. and C. J. Humphries. 2007. Biodiversity Databases: techniques, Politics, and Applications. CRC Press, New York.
- Cushman, S. and Huettmann F. (Eds.) 2010. Spatial Complexity, Informatics and Wildlife Conservation, Springer, Japan
- Esanu J.M. and Uhler P.F. (Eds) 2004. Open Access and the Public Domain in Digital Data and Information for Science: Proceedings of an International Symposium.

Unknown  
Sep 7, '05, 9:12 AM  
Added Text

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Sep 7, '05, 9:12 AM  
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U.S. National Committee for CODATA, National Research Council.  
Guenther, O. 1998. Environmental Information Systems. Springer. New York.  
National Research Council of the National Academies 2003. Sharing Publication-related  
Data and materials. The National Academies Press, Washington D.C.

Supplies required: Computing environment (word processing, printer, Open Office, R,  
USB stick and internet access), notebook, pen. Laptop would be preferential.

Disabilities Services: The Office of Disability Services implements the Americans with  
Disabilities Act (ADA), and insures that UAF students have equal access to the campus  
and course materials. I will work with the Office of Disabilities Services (203 WHIT, 907  
474-5655) to provide reasonable accommodation to students with disabilities.



**F6XX Eco-Informatics (Fall 2013)**  
**Lecture and Lab Assignment Topics by Falk Huettmann**  
(tentative, version 12<sup>th</sup> September 2012)

**Lectures**

<b>Date</b>		<b>General Topic</b>	<b>Specific Topic</b>
September	14	1. Introduction	Information about the course; what is Eco-Informatics
	16	2. Wildlife Ecology	Baseline Information about Ecology, Wildlife and Habitat
	21	3. Habitats	Baseline Information and Common Schemes about Habitat and Natural Resources worldwide
	23	4. Computing	Computational Methods, Hard- and Software
	28	5. Databases	Database Concepts, SQL
	30	Guest Lecture	Spatial Modeling
October	5	6 Metadata	ISO Metadata Concepts
	7	7. Data Mining	Finding patterns and signals in (messy) data
	12	8. Online Databases	Online Data Archives
	14	9. GIS	Spatial Databases
	19	10. Programming	Introduction to R and S
	21	11. Project Management	How to manage an (international) Eco-Informatics project
	26	12. Visualization	Multidimensional visualizations of Ecological data
	28	Mid-term	Exam first half of course
November	2	13. Remote Sensing	Remote Sensing: Databases and Computational Intensive Applications
	4	14. Digital Divide and Data Sharing Policies	Global Aspects of Data Sharing and Cloud Computing
	9	15. Sustainability Applications	Real world relevance of Eco-Informatics: Sustainable Economics

	11	16. Genetics & Evolutionary Applications	Genbank and similar applications (Phylogenetics)
	16	17. Google Earth/ Ocean	Introduction, Application and Data Exchanges
	18	18. Taxonomies	ITIS, SPECIES2000. WORMS and species lists
	23	Guest lecture	BioInformatics
	25	19. GAP projects	Fielddata, AK Gap project and wider context (GBIF)
	30	20. Advanced GIS	High resolution GIS data and processing
December	2	21. Statistical issues	Eco-Informatics contributions to Statistics
	7	22. Environmental Monitoring	GEOSS (Global Earth Observation System of Systems): Databases, Delivery and Statistical Rigor
	9	23. Eco-Informatics and Institutions	Administrative Cultures, and how to set them up efficiently: Workflows, Workbenches and the Cloud
Last day of class	14	24. Case Study: GBIF, OBIS and GMBA	Earth, Ocean and Mountain Biodiversity applications
Final Exam	15	Final Exam	8 a.m. -10 a.m. room 103 Irving 1

**Lab Assignments (includes performance tests & discussion of publications)**

Date		General Topic	Specific Topic
September	18	Lab introduction	Lecture, Lab Intro, Internet, Accounts
	25	Wildlife Specimens	Specimen Collections, geo-referencing, databases
	2	Habitat Databases	Setting up a Wildlife and Habitat Protocol & Database
October	9	Metadata	Develop Project Metadata & Templates
	16	Computing	Making Computers and Code faster and efficient
	23	Data Mining	Mine your Database



	30	Data flow	Design a Data Flow Model for Eco-Informatics projects
	6	Programming	Develop R , S code
November	13	GIS model	Develop spatial (GIS) models
	20	Online Webportals	Assess Global Webdata Portals
	27	Species Lists	Develop & Link Species Lists
December	4	Environmental Monitoring	Assess and Design an Environmental Program
	11	Project	Eco-Informatics Project time (Data Paper and Publication)