

Submit original with signatures + 1 copy + electronic copy to UAF Governance.

See <http://www.uaf.edu/uafgov/faculty/cd> for a complete description of the rules governing curriculum & course changes.

**TRIAL COURSE OR NEW COURSE PROPOSAL**

**SUBMITTED BY:**

<b>Department</b>	Fisheries Division	<b>College/School</b>	School of Fisheries and Ocean Sciences
<b>Prepared by</b>	Franz Mueter	<b>Phone</b>	907-796-5448
<b>Email Contact</b>	fmueter@alaska.edu <i>zneumann@alaska.edu</i>	<b>Faculty Contact</b>	Franz Mueter

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

**2. COURSE IDENTIFICATION:** Dept  Course #  No. of Credits

Justify upper/lower division status & number of credits:

**3. PROPOSED COURSE TITLE:**

**4. To be CROSS LISTED? YES/NO**  Yes  MSL  Course #

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

**5. To be STACKED? YES/NO**  If yes, Dept.  Course #

**6. FREQUENCY OF OFFERING:**   
Fall, Spring, Summer (Every, or Even-numbered Years, or Odd-numbered Years) — or As Demand Warrants

**7. SEMESTER & YEAR OF FIRST OFFERING (if approved)**

**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)

**9. CONTACT HOURS PER WEEK:**  LECTURE hours/weeks  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/cd/credits.html> for more information on number of credits.

OTHER HOURS (specify type)

**10. COMPLETE CATALOG DESCRIPTION including dept., number, title and credits (50 words or less, if possible):**

**FISH 631: Data Analysis in Community Ecology (3 credits)**  
This course will provide an overview of statistical methods that have been specifically developed to aid our understanding and interpretation of the structure, abundance, and distribution of species and communities in relation to resources and the environment.

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11. **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

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

O = Oral Intensive, Format 6  W = Writing Intensive, Format 7  Natural Science, Format 8

12. **COURSE REPEATABILITY:**

Is this course repeatable for credit?

YES  NO

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

[Empty box]

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

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

LETTER:  PASS/FAIL:

**RESTRICTIONS ON ENROLLMENT (if any)**

14. **PREREQUISITES**

STAT 200, STAT 401 or equivalent, FISH 693 (Stat Comp. with R) or familiarity with R, General Ecology, Graduate Standing in Fisheries or permission of instructor

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

**RECOMMENDED**

Classes, etc. that student is strongly encouraged to complete prior to this course.

15. **SPECIAL RESTRICTIONS, CONDITIONS**

16. **PROPOSED COURSE FEES**

\$

Has a memo been submitted through your dean to the Provost & VCAS 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.:

Spring 2009

18. **ESTIMATED IMPACT**

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

No impacts beyond normal teaching requirements. The instructor is tenure-track faculty with the Fisheries Department and will teach this course as part of his workload requirement at UAF

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

Contacted library collections (Karen Jensen) when I offered the course as a special topics on July 30, 2008. No anticipated effects on library/media collections, equipment, and services.

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)

[Empty box]

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No additional impact is anticipated beyond the impacts of the original special topics course.

It is possible that biology students sign up for this course, but this was not the case when the original special topics course was offered. The biology department offers a broader survey class (BIOL 680: Data Analysis in this course includes multivariate analyses that overlap to some extent with 'Applied Multivariate Statistics' (STAT 461), which is offered by the Statistics department in alternating years (spring of even years).

The current course has a much more specific focus on methods used in community ecology, hence I expect little if any impact on STAT 461 or BIOL 680.

**21. POSITIVE AND NEGATIVE IMPACTS**

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

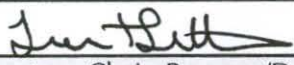
No negative impacts. This course is designed for fisheries and marine science students. Does not duplicate any other course and our students will get training that is not offered anywhere else.

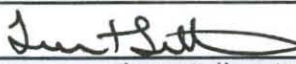
**JUSTIFICATION FOR ACTION REQUESTED**

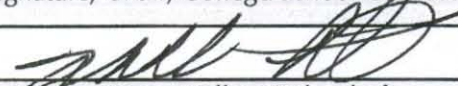
The purpose of the department and campus-wide curriculum committees is to scrutinize course change and new course applications to make sure that the quality of UAF education is not lowered as a result of the proposed change. Please address this in your response. This section needs to be self-explanatory. Use as much space as needed to fully justify the proposed course.

As I plan on teaching this course every other spring, I would like to change it from a special topics to a new course. The course was taught once in the spring 2009, was well attended (12 graduate students), and was well received by students. It appeared to fill a definite need and the analytical techniques that were covered have already been used extensively by at least 3 of the students in their thesis work. Therefore converting it to a new course seems warranted.

**APPROVALS:**

 Date 09/02/10  
Signature, Chair, Program/Department of: Fisheries Division

 Date 09/02/10  
Signature, Chair, College/School Curriculum Council for: SFS

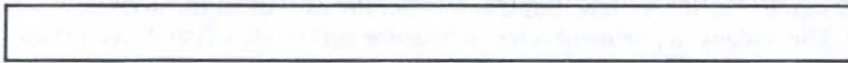
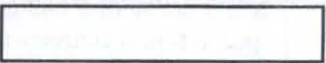
 Date 9/10/10  
Signature, Dean, College/School of: SFS

\_\_\_\_\_  
Date \_\_\_\_\_

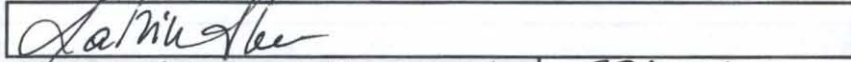
Signature of Provost (if applicable)

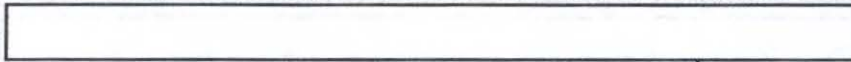
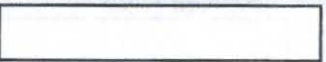

Offerings above the level of approved programs must be approved in advance by the Provost.

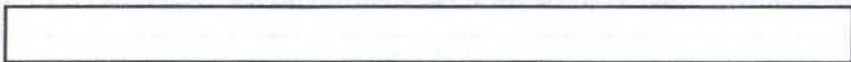
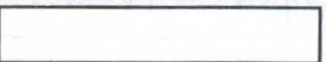

**ALL SIGNATURES MUST BE OBTAINED PRIOR TO SUBMISSION TO THE GOVERNANCE OFFICE**

	Date	
Signature, Chair, UAF Faculty Senate Curriculum Review Committee		

**ADDITIONAL SIGNATURES: (As needed for cross-listing and/or stacking)**

	Date	8 Sept 10
Signature, Chair, Program/Department of: GP15L		

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

	Date	
Signature, Dean, College/School of: 		

## ATTACH COMPLETE SYLLABUS (as part of this application).

Note: The guidelines are online: <http://www.uaf.edu/uafgov/faculty/cd/syllabus.html>

The department and campus wide curriculum committees will review the syllabus to ensure that each of the items listed below are included. If items are missing or unclear, the proposed course change will be denied.

### SYLLABUS CHECKLIST FOR ALL UAF COURSES

During the first week of class, instructors will distribute a course syllabus. Although modifications may be made throughout the semester, this document will contain the following information (as applicable to the discipline):

#### 1. Course information:

Title,  number,  credits,  prerequisites,  location,  meeting time  
(make sure that contact hours are in line with credits).

#### 2. Instructor (and if applicable, Teaching Assistant) information:

Name,  office location,  office hours,  telephone,  email address.

#### 3. Course readings/materials:

Course textbook title,  author,  edition/publisher.  
 Supplementary readings (indicate whether  required or  recommended) and  
 any supplies required.

#### 4. Course description:

Content of the course and how it fits into the broader curriculum;  
 Expected proficiencies required to undertake the course, if applicable.  
 Inclusion of catalog description is *strongly* recommended, and  
 Description in syllabus must be consistent with catalog course description.

#### 5. Course Goals (general), and (see #6)

#### 6. Student Learning Outcomes (more specific)

#### 7. Instructional methods:

Describe the teaching techniques (eg: lecture, case study, small group discussion, private instruction, studio instruction, values clarification, games, journal writing, use of Blackboard, audio/video conferencing, etc.).

#### 8. Course calendar:

A schedule of class topics and assignments must be included. Be specific so that it is clear that the instructor has thought this through and will not be making it up on the fly (e.g. it is not adequate to say "lab". Instead, give each lab a title that describes its content). You may call the outline Tentative or Work in Progress to allow for modifications during the semester.

#### 9. Course policies:

Specify course rules, including your policies on attendance, tardiness, class participation, make-up exams, and plagiarism/academic integrity.

#### 10. Evaluation:

Specify how students will be evaluated,  what factors will be included,  their relative value, and  
 how they will be tabulated into grades (on a curve, absolute scores, etc.)

#### 11. Support Services:

Describe the student support services such as tutoring (local and/or regional) appropriate for the course.

#### 12. 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.

State that you will work with the Office of Disabilities Services (208 WHIT, 474-5655) to provide reasonable accommodation to students with disabilities."

# **FISH 631: Data Analysis in Community Ecology**

## **Course Syllabus**

### **1. Course information:**

Title: Data Analysis in Community Ecology

Number: Fisheries (FISH) 631

Credits: 3

Prerequisites: STAT 200, STAT 401 or equivalent, FISH 693 (Stat. Comp. with R) or familiarity with R, general ecology, graduate standing in fisheries or permission of instructor.

Locations: Juneau: TBD; Fairbanks: TBD

Meeting times: TBD

### **2. Instructor:**

Franz Mueter, office: Lena Point 315, Office Hours: Tue & Thu 1-5pm or by appointment

Phone: 907-796-5448

E-mail: [fmuetter@alaska.edu](mailto:fmuetter@alaska.edu)

### **3. Course readings:**

Course textbook: Jongman, R.H.G., Ter Braak, C.J.F., and Van Tongeren, O.F.R. 1995. *Data analysis in community and landscape ecology*. Cambridge University Press, Cambridge.

Supplementary Readings: Hand-outs or pdf files will be provided

### **4. Course description:**

This graduate level course covers univariate and multivariate statistical methods that are commonly used in the analysis of species abundance or presence/absence data, with an emphasis on marine science and fisheries applications. Topics include data collection & management, resource selection functions, dissimilarity measures, ANOSIM, multivariate normal distribution and multivariate outliers, ordination (*Principal Components Analysis, Multi-dimensional Scaling, Correspondence Analysis, Detrended Correspondence Analysis, Canonical Correspondence Analysis*), and cluster analysis. The emphasis throughout the course is on relating the presence, abundance, or other attributes of one (univariate) or many species (multivariate) to underlying environmental gradients, or to compare attributes among levels of a factor. Methods for drawing valid statistical inferences are illustrated with case studies and through hands-on labs, including the use of generalized linear models for modeling univariate data (logistic regression, Gaussian regression, Poisson regression), and distance-based randomization approaches for analyzing multivariate data.

### **5. Course goals:**

General:

- Provide students with a general understanding of the quantitative methods that have been developed specifically to address problems in community ecology and to detect and test for spatial patterns, temporal trends, and multi-species interactions in environmental and ecological data sets.
- Provide students with the tools and the skills required to implement these methods.
- Prepare students for a career requiring the exploration and analysis of ecological datasets.

Student learning outcomes:

- Familiarity with multivariate statistical methods and software packages to implement them
- Ability to independently conduct exploratory analyses of multivariate environmental and biological datasets and to test specific hypotheses about patterns, trends, and relationships.
- Ability to communicate results from multivariate analyses to the public and to decision makers.

## 6. Instructional methods:

Lecture format with question and answer periods and occasional group discussions; short hands-on sessions will introduce methods discussed in class; weekly homework assignments will re-enforce concepts learned in class. Students will be required to complete an individual project in which they describe and analyze a multivariate dataset of their choice.

## 7. Course calendar:

<u>Date</u>	<u>Topic</u>
1	1. <u>Introduction</u> : Course goals and overview
2	2. <u>Single species analyses</u> (Autecology): a. Measures of prevalence and abundance b. Data collection, data management and data organization
3	c. Exploratory analyses: i. Graphical exploration ii. Frequency distributions
4	c. Exploratory analyses: iii. Standardizations and transformations iv. Outliers
5	d. Direct gradient analysis: Regression analyses to explore relationships between species and their environment i. Response curves, resource selection functions
6	ii. Quantitative abundance data (Least-squares regression and Poisson regression)
7	iii. Presence / absence data (logit regression)
8	3. <u>Multi-species analyses</u> (Synecology or community ecology) a. Overview
9	c. Univariate summaries of multi-species data: species richness, species diversity, evenness
10	d. Multivariate analyses i. Matrix algebra for ecology
11	Review & questions
12	Mid-term examination
13	Spring Break
14	Spring Break
15	3.d. Multivariate analyses i. Graphical summaries: Species distributions, ABC curves
16	ii. multivariate distributions, multivariate distance, identifying multivariate outliers
17	iii. Dissimilarity measures iv. Analysis of similarity (ANOSIM)
18	v. Finding patterns in species abundance data through indirect gradient analysis (Ordination): 1. Overview 2. Multi-dimensional scaling
19	NO CLASS
20	3. Interpretation of ordination with external data: graphical, BIO-ENV
21	4.a. Weighted averaging and reciprocal averaging
22	4.b Correspondence Analysis, Detrended Correspondence Analysis
23	5. Biplot of species and site scores
24	6. Canonical ordination a. Canonical correspondence analysis
25	b. Canonical correlation analysis, redundancy analysis

26	3.d.vi. Identifying species and station groups in species abundance data 1. Overview
27	2. Cluster analysis
28	Review & questions
29	Final Examination

### 8. Course policies:

- Attendance is mandatory unless excused beforehand
- Tardiness is unacceptable and will impact evaluations
- Class participation is encouraged and will be part of your grade. You are encouraged to ask questions and comment as you feel appropriate in class.
- Small-group discussions and collaboration on homework assignments and projects are encouraged
- I will try to schedule exams to avoid conflicts. However, there are some unavoidable circumstances that may take precedence (such as field work). If you inform me in a timely manner, I will arrange for a makeup exam.

### 9. Evaluation: See Table below.

Item	Date	Percent of Grade
1. Homework assignments	Throughout semester	40
2. Mid-term examination	See course outline	10
3. Individual project	Last day of classes	20
4. Final examination	See course outline	20
5. Class participation	Throughout semester	10
<b>TOTAL</b>		<b>100</b>

Each homework assignment, as well as the in-class mid-term and class participation, will be worth 10 points and will be graded in increments of 0.5 points. An individual student project and the final exam will be worth 20 points each. I will assign letter grades, which will be determined based on the total number of points obtained as follows:

Points	Grade
90 - 100 points	A ( $\leq 92.5$ : A-, $\geq 97$ : A+)
80 - 89.5 points	B ( $\leq 82.5$ : B-, $\geq 87$ : B+)
70 - 79.5 points	C ( $\leq 72.5$ : C-, $\geq 77$ : C+)
60 - 69.5 points	D ( $\leq 62.5$ : D-, $\geq 67$ : D+)
< 60 points	F

### 10. Support Services: Please see instructor if you have any special needs.

Additional help, non-subject oriented, can be obtained through the SFOS Academic Coordinator's office:

Christina Neumann  
 Phone: 907- 474-5840  
 email: [neumann@sfos.uaf.edu](mailto:neumann@sfos.uaf.edu)

**11. Disabilities Services:** The instructor will work with the Office of Disabilities Services to provide reasonable accommodation to students with disabilities to ensure equal access to campus and to course materials in accordance with UAF policy and the ADA.