FORMAT 8

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REQUEST FOR CORE NATURAL SCIENCE DESIGNATOR

SUBMITTED BY:

Department	**Biology and Wildlife**	**College/School**	**CNSM**
Prepared by	**Laura Conner**	**Phone**	**X 6950**
Email Contact	**ldconner@alaska.edu**	**Faculty Contact**	**Laura Conner**

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

1. COURSE IDENTIFICATION:

Dept	BIOL	Course #	102	No. of Credits	4

COURSE TITLE	**Biology of Sex**

CONTACT HOURS PER WEEK:	3	LECTURE hours/weeks	3	LAB hours /week		OTHER specify type

Note: To meet the natural science requirement, courses must have 4 credit hours and include a laboratory. See http://www.uaf.edu/uafgov/faculty/cd/credits.html for more information on number of credits.

Existing Course		New Course Pending Approval*	X

*Must be approved by appropriate Curriculum Council.)

2. CURRENT CATALOG DESCRIPTION AS IT APPEARS IN THE CATALOG: including dept., number, title and credits

BIOL 102
4 credits
Offered Spring
Prerequisites: Placement in DEVM 105; Placement in ENG F11X

What is sex, and why is it important? This course explores the biological basis of sexual reproduction and sexual behavior among animals (including humans) and other organisms. Topics include mating systems, sperm competition, gender, courtship, and deception. The class will also examine the nature of science, including the process of posing and testing hypotheses.

JUSTIFICATION FOR ACTION REQUESTED

The purpose of the department and campus-wide curriculum committees is to scrutinize course designator 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 change and explain what has been done to ensure that the quality of the course is not compromised as a result.

This course is intended as a non-majors course. The focus of the course, the biology of sex, is an ideal and interesting platform from which to explore evolutionary theory and other foundational concepts in biology. We expect that the course will be a draw for students, and may ultimately entice some to switch majors. The course instructor, Laura Conner, holds a PhD in Ecology and Evolutionary Biology and has a publication record in the area of mating behavior and sperm competition. The course is envisioned as a

core natural science course that, along with a nutrition course, will ultimately replace BIOL 103X.

ALONG WITH THIS FORM PLEASE SUBMIT THE FOLLOWNG:

A	A course syllabus (see page 24)
B	Titles of all laboratory exercises.
C	Title of a representative textbook.
D	Detailed outline of 3 laboratory exercises. Please attach an explanation of how these laboratory exercises have been designed to familiarize students with methods for the acquisition and expansion of scientific knowledge, including: a) data collection and analysis, b) hypothesis building, and c) experimentation.
E	A list of the major scientific concepts that the course will convey. The attached syllabus should make it clear that the course is organized around these major concepts rather than their application.
F	An explanation of how the relationship between science and society will be explored in the course. Identify where the course public science policy and its development are discussed.
G	A plan for its effectiveness evaluation.

APPROVALS: As per attached signatures (next page).

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

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

	Date	
Signature, Chair, Senate Core Review Committee		

COURSE SYLLABUS
Biology of Sex
BIOL 102
4 credits

Meeting times: Tuesday/Thursday (time TBA)

Lab meeting times and place: TBA

Meeting place: TBA

Prerequisites: Placement in DEVM 105; Placement in ENG F111X. This course is intended for non-biology majors.

Instructor: Dr. Laura Carsten Conner
907-474-6950
ldconner@alaska.edu
Bunnell 307B

Office hours: Tues 12-2 or by appt.

Lab instructors: TBA

Course description

What is sex, and why is it important? This course explores the biological basis of sexual reproduction and sexual behavior among animals (including humans) and other organisms. Topics include mating systems, sperm competition, gender, courtship, and deception. The class will also examine the nature of science, including the process of posing and testing hypotheses.

Course goals

Sex is fascinating. A survey of the animal kingdom reveals an astonishing numbers of strategies used to woo mates, compete with rivals, choose the best mate, or to fertilize eggs. Plants, fungi, and other organisms are equally as fascinating—some have eschewed sex completely, while others are both male and female. This course aims to examine this diversity through the

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APPROVALS:

Signature, Chair, Program/Department of:	Date	10/c/12
Signature, Chair, College/School Curriculum Council for: CNSM	Date	10/2/2012
Signature, Dean, College/School of: CNSM	Date	10/3/12

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

Signature, Chair, Senate Core Review Committee	Date

lens of evolution. We will also explore the mechanistic basis of this diversity, as well as what it means to "do science."

Student Learning outcomes

Upon completion of the course, students will be able to do the following:

- Compare and contrast science with other ways of knowing
- Create hypotheses and devise experiments to test hypotheses
- Distinguish between proximate and ultimate explanations for behaviors
- Describe the features of diverse mating systems, such as polygyny and polyandry
- Compare and contrast mitosis with meiosis
- Describe the principles of natural selection, including sexual selection
- Explain why monogamy is rare in nature
- Compare and contrast asexual and sexual reproduction
- Apply evolutionary principles to explain sexual behaviors, including human behaviors
- Explain why female promiscuity is common in nature
- Describe the features of diverse parental care strategies and why they have evolved
- Demonstrate ability to organize and communicate ideas about scientific knowledge
- Explain certain human societal features through the lens of evolution

Required Textbooks

Alcock, J. 2009. *Animal Behavior, 9th Edition*. Sinauer Associates. 546 pp.

Judson, O. 2002. *Dr. Tatiana's Sex Advice to all Creation*. Metropolitan Books. New York. 308 pp.

I will distribute **Reading Packets** at the beginning of class that contain select chapters from other publications, case studies, and readings from the primary literature.

Instructional Methods and Assignments

This is a lecture and laboratory course. I use active learning techniques in class, including think-pair-share, case studies, hands-on demonstrations and activities, and clicker questions. Science education research has demonstrated that active learning techniques increase grasp and retention of content. Course grades will be based on 3 middle-of-term exams, the final examination, completion of four case studies in class, and participation (see point breakdown below, under "Grading"). Lecture notes will be posted on Blackboard within 24 hours of a lecture; however, because of the active nature of the class, many in-class activities will not be reflected in the lecture notes.

Exams
Course exams will use a combination of multiple choice, short answer, and essay questions. In order to do well, you will need to understand the principles underlying major concepts, rather than simply memorizing facts. Exams must be taken at the scheduled time except in the case of university sanctioned events (such as participation in UAF athletic events) or emergencies. In the case of sanctioned events, you must contact me at least 1 week prior to the exam to notify me of your absence, and the exam must be taken prior to the absence. In the case of emergencies, you must notify me as soon as possible via email or phone about the absence. Make-up exams in the case of emergencies must be taken within 48 hours of the emergency if possible. Expect to provide documentation of the emergency.

Case studies
There will be 4 graded case studies during the semester which ask students to evaluate a data set or a scenario and answer questions. Case studies will generally be assigned as in class activities, and will be completed in pairs or small groups.

Participation
I expect you to attend class and participate actively. As mentioned above, I will use many active learning techniques in class. During class, you may be asked to devise hypotheses and simple experiments to test your hypotheses in small groups or pairs. You may be asked to turn in written, 1-minute responses to questions posed in class, or to participate in other in-class activities. We will also use whole-class discussion as a learning tool. Your participation grade will be based on regular participation in these activities.

Clickers
I will use the i-clicker response system to monitor learning and to identify points of misunderstanding. There is no need to purchase an i-clicker; they will be passed out and collected at the end of a class period when they are used. Note that the i-clicker is not the same clicker that is used in the Chemistry Department or in some other departments at UAF. The i-clicker is now being used in other classes in the Biology & Wildlife department and the Geology & Geophysics department. If you wish to purchase the i-clicker, the cost is about $40.

Laboratories
The course laboratories are arenas in which to become familiar with tools and approaches used in science. Students will start with guided experiments and gradually move toward creating and testing student-generated hypotheses. We will explore societal implications of questions related to gender and sex determination. In the first half of lab (prior to spring break), students will receive a lab handout for each lab period. Each lab exercise will be graded. After spring break, students will work in pairs or groups to develop and complete a student-devised experiment, including presenting results to the class. In total, the lab makes up ~25% of your overall grade.

Attendance in lab is <u>mandatory.</u> If you are absent from your lab section, you may participate in another lab section during that same week with permission from both your T.A. and the T.A. of the other lab. If you miss a lab experience, you will receive a zero for the lab assignment for that week.

Grading

Assignment	**Points**
Case Studies (complete 4)	100
Exam 1	100
Exam 2	100
Exam 3	100
Final Exam	100
Participation	50
Lab	250
TOTAL	**800**

Grades will be calculated as a percentage of the 800 points possible in the course.

90-100% = A
80-89% = B
70-79% = C
60-69% = D
Below 60 = F

Attendance Policy

I expect you to attend class and participate. Science education research has demonstrated that students who take an active role in their learning learn more and retain that knowledge longer. In other words, participation will help you get the most out of the course. Ultimately, you are in charge of your own learning. If you choose not to attend lecture, you will not get the most out of your education. It is also difficult to participate if you are absent; thus, regular absences will negatively impact your participation grade. As noted above, lab attendance is mandatory.

Plagiarism/Academic Honesty

Disciplinary action may be initiated in cases of plagiarism, cheating, and/or academic dishonesty. Pleas refer to the student code of conduct:
http://www.uaf.edu/catalog/current/academics/regs3.html#Student_Rights

Student Support

Students with special needs or concerns can contact Student Support Services (474-6844). Please let us know at the beginning of the semester if you will require accommodations due to a documented disability, and we will work with you in conjunction with the Office of Disability Services (203 WHIT, 474-7043).

Lecture schedule

Date	**Topic**	**Readings**
16-Jan	Introduction	Judson preface
21-Jan	What is sex? Asexual vs. sexual reproduction	Reading 1 in packet
23-Jan	The Nature of Science	Reading 2 in packet
28-Jan	Darwinian Theory and levels of analysis	Alcock Ch. 1
30-Jan	Advantages of sex	CASE STUDY 1
4-Feb	Nature vs. Nurture?	Alcock Ch 3.
6-Feb	EXAM 1	
11-Feb	What does it mean to be male or female?	Judson Ch. 1 & 2
13-Feb	Gender and behavior: what is “normal”?	Judson Ch. 9
18-Feb	Hermaphrodites: animals	Judson Ch. 12
20-Feb	Hermaphrodites: plants	Reading 3 in packet
25-Feb	Sex determination	CASE STUDY 2
27-Feb	Sex ratios	Reading 4 in packet
4-Mar	EXAM 2	
6-Mar	Mate competition and sperm competition	Alcock Ch. 10
11-Mar	Mate choice and cryptic female choice	Judson Ch. 3
13-Mar	Courtship and deception	CASE STUDY 3
18-Mar	**Spring Break—no class**	
20-Mar	**Spring Break—no class**	
25-Mar	Mating systems I	Alcock Ch. 11
27-Mar	Mating Systems II	Judson Ch. 10
1-Apr	Parental care: before birth	Alcock Ch. 12
3-Apr	Parental care: after birth	
8-Apr	EXAM 3	
10-Apr	Parent/offspring conflict	
15-Apr	Parental conflict: Mom vs. Dad	
17-Apr	Humans: attracting and assessing mates	Alcock Ch. 14
22-Apr	Humans: manipulation and deception	CASE STUDY 4
24-Apr	Humans: mating systems	
29-Apr	TBD (student choice)	

1-May	REVIEW
TBA	FINAL EXAM

Lab Schedule

Week of:	**Topic**
Jan 27-31	Observation and ethograms: crickets
Feb 3-7	IACUC and the ethical treatment of animals
Feb 10-14	Designing testable hypotheses: isopods
Feb 17-21	Gender, sex determination, and society
Feb 24-28	Operational Sex Ratio: walnut flies
Mar 3-7	Territoriality: crayfish
Mar 10-14	Courtship display: crickets
Mar 17-21	**Spring Break- no lab**
Mar 24-28	Student project formulation
Mar 31-Aprl 4	Student Project data collection
Aprl 7-11	Student Project data collection
Aprl 14-18	Analysis and interpretation
Aprl 21-25	Creation of presentations
Aprl 28-May 2	Oral presentations of projects