

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
(Attach copy of syllabus)

SUBMITTED BY:

Department	Biology & Wildlife	College/School	CNSM
Prepared by	Kristin O'Brien, Andrej Podlutsky	Phone	KO'B: 474-5311 AP: 474-6759
Email Contact	kmobrien@alaska.edu apodlutsky@alaska.edu	Faculty Contact	Andrej Podlutsky Kristin O'Brien

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

2. COURSE IDENTIFICATION: Dept **BIOL** Course # **F4XX** No. of Credits **3**

Justify upper/lower division status & number of credits: **The course builds on fundamental cell biology and chemistry concepts and basic laboratory techniques acquired in lower division courses.**

3. PROPOSED COURSE TITLE: **Advanced Cell and Molecular Biology Laboratory**

4. To be CROSS LISTED? YES/NO yes If yes, Dept: **CHEM** Course # **F4XX**

NOTE: Cross-listing 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 # _____

How will the two course levels differ from each other? How will each be taught at the appropriate level?:

* Use only one Format 1 form for the stacked course (not one for each level of the course!) and attach syllabi. 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: **Every year**
 Fall, Spring, Summer (Every, or Even-numbered Years, or Odd-numbered Years) — or As Demand Warrants

7. SEMESTER & YEAR OF FIRST OFFERING (Effective AY2015-16 if approved by 3/31/2015; otherwise AY2016-17) **2016, spring**

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) **Lectures and Labs**

RECEIVED

OCT 15 2014

Dean's Office
College of Natural Science & Mathematics

Governance
10/22/14 TJP

9. CONTACT HOURS PER WEEK:

1.5

LECTURE
hours/weeks

4.5

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 F4XX Advanced Cell and Molecular Laboratory

3 Credits Offered Spring

Modern molecular biological techniques including protein and nucleic acid gel electrophoresis, western blotting, cell fractionation, cellular respiration, enzymology and fluorescence microscopy. Lectures will be supplemented with reading from the primary literature. Prerequisites: BIOL F360 (may be taken concurrently); or permission of instructor. Cross-listed with CHEM F4XX. (1.5+4.5)

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:

X

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

O = Oral Intensive, Format 6

W = Writing Intensive, Format 7

X = Baccalaureate Core

11.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

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).

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: Changing the grading system for a course later on constitutes a Major Course Change – Format 2 form.

LETTER:

PASS/FAIL:

RESTRICTIONS ON ENROLLMENT (if any)

14. PREREQUISITES

BIOL F360 (may be taken concurrently); or permission of instructor

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

15. SPECIAL RESTRICTIONS, CONDITIONS

16. PROPOSED COURSE FEES

\$

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

Yes/No

Not yet

17. PREVIOUS HISTORY

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

Yes/No

Not in this form

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

Similar labs were taught at a less sophisticated level in BIOL F261 before the lab was stripped from that course in 2013.

18. ESTIMATED IMPACT

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

No negative impact anticipated

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

Library resources are adequate for the course

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)

The course will require lecture and laboratory space in Murie. The course will be part of the instructors' regular workloads.

21. POSITIVE AND NEGATIVE IMPACTS

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

Positively, the addition of this course will provide more choices to students interested in cell biology and physiology. The department has few cell-related electives, so we do not expect this course to have a strong negative impact on enrollment in other courses. We anticipate that students techniques and approaches taught in the course will provide useful tools for undergraduate research project, including capstone projects conducted as individual study.

The course will not impact the other courses that K. O'Brien teaches. She will continue to co-teach Fundamentals of Biology I (BIOL 115X) in the fall of odd years, co-teach Synthetic Biology (BIOL/MATH 393) in the fall of even years, and Podlutzky and O'Brien will co-teach Cell Biology (BIOL 360) and this proposed course during spring semesters.

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.

The course will contribute to the Biological Sciences B.S. Concentration in Cell and Molecular Biology (CMB) in an important way, by teaching modern laboratory techniques, experimental approaches, and advanced concepts to students with interests in cell biology. Eventually, we expect this course to shift from an elective to a requirement for students in the CMB concentration.

APPROVALS: Add additional signature lines as needed.

 (Diane Warner)	Date	9/23/14
Signature, Chair, Program/Department of:	Biology & Wildlife	

*

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

	Date	
Signature, Dean, College/School of:		

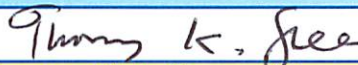
Offerings above the level of approved programs must be approved in advance by the Provost.


	Date	
Signature of Provost (if above level of approved programs)		

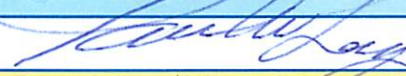
ALL SIGNATURES MUST BE OBTAINED PRIOR TO SUBMISSION TO THE GOVERNANCE OFFICE

	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:	Chemistry + Biochemistry	

	Date	10-22-14
Signature, Chair, College/School Curriculum Council for:	CNSM	

	Date	10/21/14
Signature, Dean, College/School of:	CNSM	

Revision signed 10/15/14

BIOL/CHEM 4XX Advanced Laboratory in Cell and Molecular Biology

3 Credits

Dr. Kristin O'Brien
kmobrien@alaska.edu; 474-5311
323E Margaret Murie Building
office hrs: TBA and by appointment

Dr. Andrej Podlutsky
apopdlutsky@alaska.edu; 474-6759
AHRB 2W04
office hrs: TBA and by appointment

Time, days: TBA

Teaching Assistants: TBA

Pre-requisite: BIOL/CHEM 360 Cell and Molecular Biology (or equivalent; may be taken concurrently)

Required items: *Essential Cell Biology* (3rd edition) by Alberts *et al.* Garland Publishing, 3-ring binder for lab manual. The manual will be available for purchase in the Biology & Wildlife office at the start of the semester.

Course description: An advanced laboratory in cell and molecular biology. Students will learn modern molecular biological techniques including, protein and nucleic acid gel electrophoresis, western blotting, cell fractionation, cellular respiration, enzymology and fluorescence microscopy. Lectures will be supplemented with reading from the primary literature.

Course goals: Students will master lab techniques commonly used in cell and molecular biology, learn how to write a scientific paper, sharpen critical thinking skills, and practice working with others to solve problems. The focus of the laboratory will be on the physiological, biochemical and molecular responses to exercise, using rats as a model organism. A central goal of this course is to prepare students for working independently in a cell, molecular biology or biochemistry laboratory.

Student learning outcomes: Students will design and conduct experiments to determine the impacts of exercise on cellular metabolism, gene expression and oxidative stress. Students will become proficient in quantifying protein concentration, measuring maximal activity of key metabolic enzymes, quantifying changes in gene expression (including isolating and quantifying RNA, and designing gene-specific primers), quantifying DNA damage caused by oxidative stress, and measuring mitochondrial respiration rates. Students will become proficient in writing a scientific paper. Students will also become proficient in searching, reading and discussing primary literature.

Instructional methods: This course will be taught through a combination of lectures, laboratories, and discussions of the primary literature. The laboratories will be centered around understanding how muscles are remodeled in response to exercise. We will examine how protein and gene expression changes, how mitochondrial function changes, and how

parameters of oxidative stress change in response to exercise in rates. Prior to each laboratory, we will read and discuss 1-2 articles from the scientific literature in which similar techniques have been used to address similar questions. Two students will be assigned to lead the discussion on a paper each week.

Policies: Students are expected to attend class and complete reading assignments prior to coming to class in preparation for group discussions and/or activities.

Lab assignments are due at the start of each lab period. No late assignments will be accepted unless you have a medical excuse and a doctor's note, explaining your illness. You must attend the lab to earn credit for the assignment. There will be no make-up labs.

Exams: Exams will be based on material covered in both the lecture and lab. If you anticipate missing an exam for family or work commitments, please let us know in advance so that we can make other arrangements. If you must miss an exam because of unexpected, extenuating circumstances (ie; family death, medical excuse) then you must contact me as soon as possible.

Blackboard: Blackboard will be used to post grades, announcements, lab materials, and reading assignments. Please check the Blackboard site on a regular basis. If you have a smartphone, you can download the Blackboard App, which will notify you immediately when new announcements have been posted.

Email etiquette: We will use UAF email accounts to contact students. Please check your UAF account on a regular basis. If you use an alternate account, please have your UAF email forwarded to that account. We will do our best to respond to your email inquiries within 24 hrs. Please be considerate in your letters and use proper English grammar. Think before you send and never write anything you would feel uncomfortable saying to us (or anyone else!) in person. Please use a greeting and sign your letter; addresses don't always reveal the identity of the writer.

Disabilities: Please let us know if you have a disability. We will work with the Office of Disabilities Service (203 WHIT, 474-7043) to provide accommodations in both the classroom and laboratory to provide equal access to all materials in this course to all students.

Support services: Writing Center 801 Gruening

Grading: Your final grades will be based on the following:

- 1. Exams (200 pts):** There will be two exams during the semester (a mid-term and final), each worth 100 points. The purpose of these exams is to assess your understanding of the material, interpret data from the primary literature, and to develop your written communication and critical thinking skills.
- 2. Laboratory assignments (425 points):**

- a. **Short assignments (140 pts).** A short assignment, worth 10 points (140 points total), will be given following each laboratory. Some of the questions will cover material in the lab for the following week. It is extremely important for you to read the lab before coming to lab. Many of the labs we will do are complex. You will enjoy the lab more, understand it better, and are more likely to obtain good results if you come prepared. Please answer your homework questions using complete sentences and neat handwriting. Points will be deducted for incomplete sentences, misspellings, poor grammar and illegible writing.
 - b. **Lab notebook (60 pts).** Each student will maintain a lab notebook. These will be checked 3 times during the semester for completeness. The first notebook check will be worth 10 pts, the second, 20 pts, and the third, 30 pts (60 pts total). Requirements for the lab notebook will be explained during the first lab.
 - c. **Lab reports (225 pts).** The labs in this course build upon one another to assess how muscle becomes remodeled in response to exercise. You will write one complete lab report, detailing the results from all experiments that will be due at the end of the semester. Following each set of labs (ie; proteomics, enzymology, etc.), you will write a mini-lab report that will include figures, figure legends and a summary of the results and appropriate statistical analyses. Each of these mini-lab reports will be worth 25 pts (125 pts total). Your final lab report, which will include all figures, figure legends, results, a title, abstract, introduction and discussion, will be worth 100 pts.
- 3. Class discussions (75 pts).** You will be tasked with leading the discussion on a scientific paper at least once during the semester and will be required to participate in discussions.

In summary your grade will be based on the following:

<u>ASSIGNMENT</u>	<u>POINTS</u>
Exams:	2 X 100 = 200
Short lab assignments	140
Lab notebook	60
Lab report	225
<u>Class discussion</u>	<u>75</u>
	700 points total

Final grades will be calculated based on the percentage of points earned out of the total as follows:

Grade	% of Total Points
A+	97-100
A	90-96
A-	88-89
B+	86-87
B	80-85
B-	78-79
C+	76-77
C	70-75
C-	68-69
D+	66-67
D	60-65
D-	58-59
F	0-57

LABORATORY SCHEDULE

WEEK OF:	TOPIC :
Week 1	Experimental design
Week 2	Lab 1 Proteomics part 1: protein assay
Week 3	Lab 1 Proteomics part 2: protein gel electrophoresis
Week 4	Lab 1 Proteomics part 3: western blotting- quantify myoglobin levels
Week 5	Lab 2 : Enzymology- maximal activity of citrate synthase and catalase
Week 6	Lab 3 DNA damage part 1: Comet assay
Week 7	Lab 3 DNA damage part 2: Comet assay
Week 8	Lab 3 DNA damage part 3: Comet assay Mid-term exam
Week 9	SPRING BREAK
Week 10	Lab 4 Gene Expression part 1: primer design & isolate RNA
Week 11	Lab 4 Gene Expression part 2: agarose gel electrophoresis
Week 12	Lab 4 Gene Expression part 3: synthesize cDNA
Week 13	Lab 4 Gene Expression part 4: quantitative real-time PCR
Week 14	Lab 5 Cellular respiration part 1: cell fractionation
Week 15	Lab 5 Cellular respiration part 2: cellular Respiration
Week 16	Final exam