

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:

Department		College/School	
Prepared by	Laura Conner	Phone	(907) 474-6950
Email Contact	ldconner@alaska.edu clneumann@alaska.edu	Faculty Contact	Laura Conner

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: The course will meet for 120 mins./week for 14 weeks for a total of 1680 minutes. The course is a graduate level course, similar to those taught at 20 other universities.

3. PROPOSED COURSE TITLE: Communicating Ocean Science

4. CROSS LISTED? YES/NO If yes, Dept: Course #
 (Requires approval of both departments and deans involved. Add lines at end of form for such signatures.)

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

6. FREQUENCY OF OFFERING: Every year. The timing of the grant activities covering the faculty costs of this course necessitate that the course be offered in spring during the first year. The sister course to this course must be offered in the spring (explanation elsewhere) and it would make the most sense to offer both during the same semester.
 (Every or Alternate) Fall, Spring, Summer — or As Demand Warrants

7. SEMESTER & YEAR OF FIRST OFFERING (if approved) Spring, 2011

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 one) 1 2 3 4 5 6 weeks to full semester

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

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):

MSL 694/ BIOL 694 Communicating Ocean Science 2 credits

Course description

This highly interactive course allows students to gain hands-on experience with teaching and

9.8.10

communicating ocean science to public audiences. Over the course of the semester, students will lead programs in K-12 schools and/or museum settings, develop a podcast and present their own science to peers. Students will also explore pedagogical theory, and learning how to use active and inquiry-based teaching strategies.

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 N = Natural Science 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).

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:

LETTER: PASS/FAIL:

RESTRICTIONS ON ENROLLMENT (if any)

14. PREREQUISITES Graduate standing in a science program or instructor permission
 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

None

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 No

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

18. ESTIMATED IMPACT

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

No budget impact is anticipated; course costs will be paid out of the NSF grant for the Alaska Center for Ocean Science Education Excellence. The costs are limited to faculty salaries and minimal administrative costs (copying, etc.)

A classroom with videoconferencing capabilities is required for 2 hours/week in Fairbanks and Juneau for the first 10 weeks of the course.

The COSEE grant will cover course costs for the next 3 years. The COSEE team plans to apply for a second round of funding, and if successful, will cover costs associated with the course for another 5 years. If this course is successful, we hope that it will be institutionalized. Over time, funds will need to be identified to cover faculty salary to teach the course.

01.8.1

19. LIBRARY COLLECTIONS

Have you contacted the library collection development officer (ffklj@uaf.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	<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>
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6/7/2010 The UAF libraries provide access to a broad array of materials related to marine science, including books, research journals, and databases useful for identifying primary literature as well as other types of materials of potential relevance to students in this course. In addition, the libraries also subscribe to similar resources in the field of education, for example, Education Abstracts and Education Complete, which would provide information for students regarding teaching methods and preparing presentations and outreach activities for a K-12 audience.

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)

We are proposing to add two sister courses with the overall theme of communicating science to K-12 audiences and the broader public. The course described in this form is "Communicating Ocean Science," and the sister course will be entitled "Communicating Climate Change Science." Despite an increasing and well-documented need for scientists to effectively communicate their science to the public, traditional scientific training typically has not prepared scientists to be effective communicators outside of academia. It also generally fails to offer explicit training in teaching methods. Such a course is needed in order to prepare science graduate students for these activities. In addition, NSF and other funding agencies are increasingly placing emphasis on "Broader Impacts" of scientific research. This course will prepare graduate students to engage meaningfully with the public, suggesting many avenues for future broader impacts throughout their careers as scientists.

The courses are cross-listed between MSL and BIOL, and we anticipate that many enrollees will come from these departments. However, we will advertise the courses widely and hope that UAF students from many science departments will enroll in the course.

Programs/departments contacted about the program to date:

Michael Castellini, Interim Dean, has been involved in course planning as a P.I. on the COSEE Alaska grant via in-person meetings, emails, and conference calls.

The UA Museum of the North has committed staff time and facilities. Carol Deibel, the Museum Director, has approved the commitments via an in-person meeting and emails.

The Alaska State Museum has been contacted and has indicated that they are excited to work with the course instructors.

NSF-funded GK-12 students from multiple departments will be required to take the sister course, *Communicating Climate Change Science*. Laura Conner is both the course instructor and the Co- P.I. on the GK-12 grant and she has recruited and selected graduate students as participants in the GK-12 program in coordination with their respective departments.

21. POSITIVE AND NEGATIVE IMPACTS

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

While the Communications department and the Biology & Wildlife department offer courses concerning scientific writing for public and other audiences, there is currently no course aimed at science graduate students that specifically prepares them to be better science teachers and communicators. These sister courses are unique in offering hands-on experience in presenting science content to public and K-12 audiences. The Department of Biology & Wildlife, SFOS, and other science departments will gain the capability to better prepare their graduate students for careers in science.

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 two sister courses will be adapted from one developed by a team of scientists and marine education specialists at the Lawrence Hall of Science and the University of California Berkeley. Versions of the course are taught at more than 20 colleges and universities. Lawrence Hall of Science educators will provide a 2 ½ day training session for the course instructors to ensure the academic quality of the course as the content is adapted to include Alaska-relevant science content and integration of Alaska Native knowledge. The instructors for both sections will be involved in the training to ensure consistency of the course content and teaching methods.

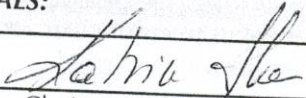
Dr. Laura Conner will be taking the lead on the course adaptations. Dr. Conner holds a Ph.D. in Evolutionary Biology, and currently serves as a Research Assistant Professor of Science Education through the College of Natural Sciences at UAF and as the Director of Public Programs at the University of Alaska Museum of the North. She has taught science and science education courses at the K-12 and college levels for over 7 years. She also has extensive experience in communicating science to the public through her current position and through past positions as a science journalist, and Director of the Insect Discovery outreach program at the University of Arizona. In her current position at UAMN, Dr. Conner directs outreach programs with an emphasis on integrating Native knowledge with Western science for classroom and museum programs. Conner is also one of project P.I.'s for the recently launched GK-12 program, which has an emphasis on Climate Change and a subfocus on integrating Native Ways of Knowing.


Communicating Ocean Science and its sister course *Communicating Climate Change Science* are primarily about how to teach and communicate science, using principles of ocean literacy and principles of climate change, respectively, as the specific scientific focus. Scientific lectures given on these topics will model active teaching methods. The courses provide students with an introduction to the inquiry-based pedagogy used in theoretically grounded science education reform and builds on their interest in and knowledge of ocean sciences. Scientists provide the models initially and then students are provided opportunities to practice new skills.

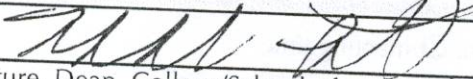
The courses would take advantage of several complementary UAF resources – research expertise in ocean sciences in SFOS, the UA Museum of the North as an informal science education venue, existing partnerships with local schools, the Center for Cross-Cultural Studies and its expertise in instructional strategies for K-12 audiences in rural and Native Alaska communities, and two interdisciplinary NSF grant programs that emphasize improving science communication and instructional skills - the Center for Ocean Science Education Excellence program and the GK12 program, each of which will provide multi-year funding to support the two sister courses as critical elements of grant activities. The grant programs will also support in-depth evaluation of the success of the course.

The courses will improve the quality of UAF instruction by addressing two critical needs: 1) helping scientists to more effectively communicate their subject; and 2) creating a greater awareness among future scientists about how to effectively carry out outreach activities. UAF currently lacks this type of course for science graduate students. Without the awareness and skills that the course will provide, students will be at a competitive disadvantage in future competitions for NSF and other federal research funding that emphasizes broader impacts of their research.

APPROVALS:

	Date	3 Sept 10
Signature, Chair, Program/Department of:	GPRSL	

	Date	09/03/10
Signature, Chair, College/School Curriculum Council for:	SFOS	

	Date	9/3/10
Signature, Dean, College/School of:	SFOS	

Signature of Provost (if applicable)	Date	
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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

Signature, Chair, UAF Faculty Senate Curriculum Review Committee	Date	
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ADDITIONAL SIGNATURES: (If required)

Signature, Chair, Program/Department of:	Date	
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Signature, Chair, College/School Curriculum Council for:	Date	
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Signature, Dean, College/School of:	Date	
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ATTACH COMPLETE SYLLABUS (as part of this application).

Note: syllabus must follow the guidelines discussed in the Faculty Senate Guide <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 Student Learning Outcomes (more specific)

6. 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.).

7. 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.

8. Course policies:

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

9. 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.)

10. Support Services:

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

11. 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."



September 1, 2010

Dear SFOS Curriculum Committee,

Thank you for your review of our recently proposed course. We had originally envisioned offering the course as a single course with two sections; on the advice of the committee, however, we have restructured and are now planning on offering two separate, cross-listed courses. This cover letter attempts to more fully explain the rationale for offering these courses.

We are proposing to add two sister courses with the overall theme of communicating science to K-12 audiences and the broader public. Despite an increasing and well-documented need for scientists to effectively communicate their science to the public, traditional scientific training typically has not prepared scientists to be effective communicators outside of academia. It also generally fails to offer explicit training in teaching methods.

In recognition of these shortcomings, programs across the nation are overhauling their programs. At UAF, the Department of Biology and Wildlife has sent several faculty members to national teacher trainings so that these individuals can incorporate active learning methods into their courses. However, there are no permanent courses within UAF science departments that offer this type of training. The courses proposed here would train graduate students in best practices for teaching science and communicating science to the public, including practicum sessions in which students would actually teach live K-12 students. After taking this course, graduate students will be better equipped not only to communicate science to all audiences, but will have learned techniques to make them more effective teachers at the college level.

Our courses will be modeled after the COSEE (Center for Ocean Sciences Education Excellence) and COSIA (Communicating Ocean Sciences to Informal Audiences) courses developed at the University of California, Berkeley (with NSF funding). A team of scientists and educators has developed two full courses, one aimed at formal audiences (COSEE, aimed at K-12) and one for informal audiences (COSIA, aimed at the general public). These courses have been field tested at many universities across the nation, customized at each institution to meet that institution's particular needs.

At UAF, we have melded the basic concepts of the COSIA and COSEE courses into a single course: *Communicating Ocean Science* (MSL/BIOL694). We are also adding content to include

a focus on Alaska Native ways of knowing. Because SFOS students are based in both Fairbanks and Juneau, we are offering the course physically in Fairbanks and will distance deliver the course to Juneau. The public presentations in the course will occur at the University of Alaska Museum of North in Fairbanks. Distance students in Juneau will complete their presentations at the Alaska State Museum in Juneau. This course will meet the goals of COSEE Alaska in terms of advancing Ocean Science Literacy for generations to come.

We will be offering a second, sister course that is very similar to *Communicating Ocean Science*. This second course fulfills the needs of the recently funded NSF GK-12 CASE program at UAF, in terms of graduate student training. The GK-12 program aims to enhance graduate student skill in teaching science and communicating science to the public through year-long teaching fellowships in K-12 schools. This sister course, *Communicating Climate Change Science*, reflects the theme of the GK-12 program and will provide high-quality training to the fellows prior to the start of the fellowship. Priority will be given to GK-12 fellows for enrollment, but we intend to keep five additional slots open for other graduate students that wish to take the course. The public presentations for this course will occur at the University of Alaska Museum of the North and in public schools in Fairbanks.

These courses will have minimal financial impact—salaries are covered through the COSEE and GK-12 grants currently held by SFOS and CNSM, respectively, for five years. Our hope is that, if successful, these courses will become institutionalized.

Thank you for your consideration. Please don't hesitate to contact me with further questions or points of clarification.

Sincerely,

Laura Conner

Research Assistant Professor, ESTES
Director of Public Programs, University of Alaska Museum of the North
University of Alaska Fairbanks
907 Yukon Drive
Fairbanks, AK 99775

Communicating Ocean Science, MSL/ BIOL 694, 2 credits

Meeting times: Tuesdays, 9:15 AM-11:15 AM

Meeting place: Bunnell 313

Prerequisites: graduate standing or permission of instructor

Instructors:

Dr. Laura Carsten Conner

907-474-6950

ldconner@alaska.edu

UA Museum of the North 132

University of Alaska Fairbanks

Fairbanks

Marilyn Sigman

907-274-9612

msigman@alaska.edu

Alaska Sea Grant/

Marine Advisory Program

1007 W. Third St. – Suite 100

Anchorage

Office hours: TBA

COURSE SYLLABUS

Course description

This highly interactive course allows students to gain hands-on experience with teaching and communicating ocean science to public audiences. Over the course of the semester, students will lead programs in K-12 schools and/or museum settings, develop a podcast and present their own science to peers. Students will also explore pedagogical theory, and learn how to use active and inquiry-based teaching strategies.

Course purpose and objectives

There is an increasing and well-documented need for scientists to effectively communicate their science to the public. This course aims to build communication and teaching skills among graduate students. In addition to gaining skills specific to presenting to public audiences, graduate students will also observe instructors and guest lecturers using inquiry-based and active learning techniques that have been shown to enhance learning in the university classroom.

The overall objectives of this course are:

- to increase graduate student skill in communicating science to different audiences, using a variety of media and methods
- to introduce future scientists to the importance of K-12 education, public outreach, and the broader impact of their work
- to increase graduate student skill in addressing cultural differences

- to familiarize graduate students familiar with teaching techniques for K12 and college audiences, especially inquiry-based approaches

Student learning objectives

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

- Develop and deliver science lessons to K-12 children
- Present science concepts to audiences of all ages through a variety of media
- Integrate science concepts into interpretive programs
- Successfully lead inquiry-based classroom experiences

Required Textbook

S. Michaels, A. W. Shouse, and H.A. Schweingruber. 2008 *Ready, Set, Science: putting research to work in K-8 classrooms*. National Academies Press.

M. Freichel and H.A. Schweingruber. 2010. *Surrounded by Science: learning science in informal settings*. National Academies Press.

Recommended Textbooks

R. Barnhardt and A.O. Kawagley. 2010. *Alaska Native Education: views from within*. Alaska Native Knowledge Network. UAF.

J. Branson et. al. 2000. *How People Learn: brain, mind, experience, and school*. National Academies Press.

Assignments and Grading

In this class, we will use both *formative* and *summative* assessment techniques. We hope that you will model these techniques in your own teaching career. Formative assessment is the process of gaining feedback and making mid-course corrections, while summative evaluations typically measure the end outcome. For example, a summative assessment tool might be an exam or an end of course term paper, while formative assessments might take many forms, such as quick five-minute writes, clicker questions, or feedback on drafts of a paper. In this class, we will model many formative assessment techniques that enable instructors to assess how well the class is gaining concept mastery *before* high-stakes assignments are complete. Summative assessment measures are described below.

Class presentation

Students will develop one 15-minute presentation for a public audience based on their own research. Students will present their talk to their classmates. The presentation should incorporate inquiry-based and active learning techniques.

Public and School presentations

The final four sessions of the class will be dedicated to application of the skills learned over the course of the class. Students will have the opportunity to develop and practice a lesson for the public on April 12th. The following week, students will present this lesson to a live public audience. Students will have the opportunity to develop and practice a lesson for a K-12 audience on April 26th. The following week, students will deliver this lesson to a live audience.

The presentations will take place in local K-12 schools and/or the UA Museum of the North for UAF students. UAS students taking the course via distance delivery will carry out presentation sessions in conjunction with the Alaska State Museum.

Final project

During the course, students will receive basic training on development of podcasts. Students will develop a basic podcast (1-3 minutes in length) related to their own research topic and present it to their peers during the final exam period.

Point breakdown

Assignment/Exam	Points	Due Date
Class presentation	50	varies
Public presentation	50	April 19
School presentation	100	May 3
Final project	100	TBA
Participation	100	
TOTAL	400	

Grades will be calculated as a percentage of the 400 points possible in the course.

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

Attendance Policy

We 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.

Due to the nature of the presentations, missed presentations cannot be made up. All scheduled presentations must be given on the day that they are scheduled. We understand that occasionally emergencies and illnesses arise. Please keep us informed in such cases, prior to a missed class when possible.

Plagiarism/Academic Honesty

Disciplinary action may be initiated in cases of plagiarism, cheating, and/or academic dishonesty. Please 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).

COURSE SCHEDULE

Date	Lecture topic	Reading Assignment
25-Jan	Why communicate science to the public? OCEAN SCIENCE: What is ocean literacy?	Ocean Lit. principles (handout)
1-Feb	Ways of knowing OCEAN SCIENCE: Sea ice: science and culture	Kawagley handout Freichel & Schweingruber Ch. 2 & 7
8-Feb	Identifying audience OCEAN SCIENCE: Ocean acidification	Freichel & Schweingruber Ch. 1
15-Feb	Inquiry-based teaching OCEAN SCIENCE: Bering Sea Ecosystem Science	Michaels et al. Ch. 1 & 2 Freichel & Schweingruber Ch. 3
22-Feb	Learning and misconceptions OCEAN SCIENCE: What drives Alaska's current systems?	Michaels et al. Ch. 3 Freichel & Schweingruber Ch. 4 & 5
1-Mar	Assessment/Standards OCEAN SCIENCE: student presentations	Freichel & Schweingruber Ch. 6
8-Mar	Questioning strategies, leading discussions OCEAN SCIENCE: student presentations	Michaels et al. Ch 5
15-Mar	SPRING BREAK, NO CLASS	
22-Mar	Developing lessons for formal and informal audiences OCEAN SCIENCE: student presentations	Michaels et al. Ch 4 & 7 Freichel & Schweingruber Ch. 3
29-Mar	Podcasts and other media OCEAN SCIENCE: student presentations	
5-Apr	Presenting science in action: Field trip to museum	Freichel & Schweingruber Ch. 9
12-Apr	Public presentation: development	
19-Apr	Public presentation	
26-Apr	School presentation: development	
3-May	School presentation	
	FINAL EXAM	

COURSE OF STUDIES

Year	Course	Grade
1968	English I	B
1969	English II	C
1970	English III	C
1971	English IV	C
1972	Math I	C
1973	Math II	C
1974	Math III	C
1975	Math IV	C
1976	Science I	C
1977	Science II	C
1978	Science III	C
1979	Science IV	C
1980	History I	C
1981	History II	C
1982	History III	C
1983	History IV	C
1984	Physical Education I	C
1985	Physical Education II	C
1986	Physical Education III	C
1987	Physical Education IV	C
1988	Art I	C
1989	Art II	C
1990	Art III	C
1991	Art IV	C
1992	Music I	C
1993	Music II	C
1994	Music III	C
1995	Music IV	C
1996	Foreign Language I	C
1997	Foreign Language II	C
1998	Foreign Language III	C
1999	Foreign Language IV	C
2000	Elective I	C
2001	Elective II	C
2002	Elective III	C
2003	Elective IV	C
2004	Elective V	C
2005	Elective VI	C
2006	Elective VII	C
2007	Elective VIII	C
2008	Elective IX	C
2009	Elective X	C
2010	Elective XI	C
2011	Elective XII	C
2012	Elective XIII	C
2013	Elective XIV	C
2014	Elective XV	C
2015	Elective XVI	C
2016	Elective XVII	C
2017	Elective XVIII	C
2018	Elective XIX	C
2019	Elective XX	C
2020	Elective XXI	C
2021	Elective XXII	C
2022	Elective XXIII	C
2023	Elective XXIV	C
2024	Elective XXV	C
2025	Elective XXVI	C
2026	Elective XXVII	C
2027	Elective XXVIII	C
2028	Elective XXIX	C
2029	Elective XXX	C

Communicating Climate Change Science, BIOL/ MSL 694, 2 credits

Meeting times: Wednesdays, 9:30 AM-11:30 AM

Meeting place: TBA

Prerequisites: graduate standing or permission of instructor

Instructor:

Dr. Laura Carsten Conner

907-474-6950

ldconner@alaska.edu

UA Museum of the North 132
University of Alaska Fairbanks
Fairbanks

Office hours: TBA

COURSE SYLLABUS

Course description

This highly interactive course allows students to gain hands-on experience with teaching and communicating climate change science to public audiences. Over the course of the semester, students will lead programs in K-12 schools and/or museum settings, develop a podcast and present their own science to peers. Students will also explore pedagogical theory, and learn how to use active and inquiry-based teaching strategies.

Course purpose and objectives

There is an increasing and well-documented need for scientists to effectively communicate their science to the public. This course aims to build communication and teaching skills among GK-12 graduate student fellows. In addition to gaining skills specific to presenting to public audiences, graduate students will also observe instructors and guest lecturers using inquiry-based and active learning techniques that have been shown to enhance learning in the university classroom.

The overall objectives of this course are:

- to increase graduate student skill in communicating science to different audiences, using a variety of media and methods
- to introduce future scientists to the importance of K-12 education, public outreach, and the broader impact of their work
- to increase graduate student skill in addressing cultural differences

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

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J. Branson et. al. 2000. *How People Learn: brain, mind, experience, and school*. National Academies Press.

Assignments and Grading

In this class, we will use both *formative* and *summative* assessment techniques. We hope that you will model these techniques in your own teaching career. Formative assessment is the process of gaining feedback and making mid-course corrections, while summative evaluations typically measure the end outcome. For example, a summative assessment tool might be an exam or an end of course term paper, while formative assessments might take many forms, such as quick five-minute writes, clicker questions, or feedback on drafts of a paper. In this class, we will model many formative assessment techniques that enable instructors to assess how well the class is gaining concept mastery *before* high-stakes assignments are complete. Summative assessment measures are described below.

Class presentation

Students will develop one 15-minute presentation for a public audience based on their own research. Students will present their talk to their classmates. The presentation should incorporate inquiry-based and active learning techniques.

Public and School Presentations

The final four sessions of the class will be dedicated to application of the skills learned over the course of the class. Students will have the opportunity to develop and practice a lesson for the public on April 13th. The following week, students will present this lesson to a live public audience in the University of Alaska Museum of the North. Students will have the opportunity to develop and practice a lesson for a K-12 audience on April 27th. The following week, students will deliver this lesson to a live audience in a local K-12 school.

Final project

During the course, students will receive basic training on development of podcasts. Students will develop a basic podcast (1-3 minutes in length) related to their own research topic and present it to their peers during the final exam period, to take place at Creamer's Field.

Point breakdown

Assignment/Exam	Points	Due Date
Class presentation	50	varies
Public presentation	50	April 20
School presentation	100	May 4
Final project	100	TBA
Participation	100	
TOTAL	400	

Grades will be calculated as a percentage of the 400 points possible in the course.

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

Attendance Policy

We 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.

Due to the nature of the presentations, missed presentations cannot be made up. All scheduled presentations must be given on the day that they are scheduled. We understand that occasionally emergencies and illnesses arise. Please keep us informed in such cases, prior to a missed class when possible.

Plagiarism/Academic Honesty

Disciplinary action may be initiated in cases of plagiarism, cheating, and/or academic dishonesty. Please 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).

Grade	Points	Letter Grade
A	90-100	A
B	80-89	B
C	70-79	C
D	60-69	D
F	50-59	F
W	0-49	W

COURSE SCHEDULE

Week of:	Lecture topic	Reading Assignment
26-Jan	Why communicate climate science to the public? CLIMATE CHANGE: Facts, fiction and controversy	Climate Change principles (handout)
2-Feb	Ways of knowing CLIMATE CHANGE: Causes of climate change	Kawagley handout Freichel & Schweingruber Ch. 2 & 7
9-Feb	Identifying audience CLIMATE CHANGE: The climate record and forecasts	Freichel & Schweingruber Ch. 1
16-Feb	Inquiry-based teaching CLIMATE CHANGE: Biophysical impacts	Michaels et al. Ch. 1 & 2 Freichel & Schweingruber Ch. 3
23-Feb	Learning and misconceptions CLIMATE CHANGE: Student presentations	Michaels et al. Ch. 3 Freichel & Schweingruber Ch. 4 & 5
2-Mar	Assessment/Standards CLIMATE CHANGE: Student presentations	Freichel & Schweingruber Ch. 6
9-Mar	Questioning strategies, leading discussions CLIMATE CHANGE: Student presentations	Michaels et al. Ch 5
16-Mar	SPRING BREAK, NO CLASS	
23-Mar	Developing lessons for formal and informal audiences CLIMATE CHANGE: Student presentations	Michaels et al. Ch 4 & 7 Freichel & Schweingruber Ch. 3
30-Mar	Podcasts and other media CLIMATE CHANGE: Student presentations	
6-Apr	Presenting science in action: Field trip to museum	Freichel & Schweingruber Ch. 9
13-Apr	Public presentation: development	
20-Apr	Public presentation	
27-Apr	School presentation: development	
4-May	School presentation	
	FINAL EXAM (Field Trip to Creamer's Field)	

Year	Activity	Location	Notes
2001	Climate Change Summit	London, UK	Key event in the early 2000s
2002	Climate Change Summit	London, UK	Continuation of the summit
2003	Climate Change Summit	London, UK	Further discussions on climate
2004	Climate Change Summit	London, UK	Addressing global warming
2005	Climate Change Summit	London, UK	Focus on international cooperation
2006	Climate Change Summit	London, UK	Reviewing progress and challenges
2007	Climate Change Summit	London, UK	Key event leading to the Paris Agreement
2008	Climate Change Summit	London, UK	Addressing the financial crisis impact
2009	Climate Change Summit	London, UK	Continuing the dialogue on climate
2010	Climate Change Summit	London, UK	Focus on adaptation and resilience
2011	Climate Change Summit	London, UK	Addressing the need for action
2012	Climate Change Summit	London, UK	Key event in the 2010s
2013	Climate Change Summit	London, UK	Continuation of the summit
2014	Climate Change Summit	London, UK	Further discussions on climate
2015	Climate Change Summit	London, UK	Key event leading to the Paris Agreement
2016	Climate Change Summit	London, UK	Addressing the Paris Agreement
2017	Climate Change Summit	London, UK	Continuation of the summit
2018	Climate Change Summit	London, UK	Further discussions on climate
2019	Climate Change Summit	London, UK	Addressing the need for action
2020	Climate Change Summit	London, UK	Key event in the 2020s
2021	Climate Change Summit	London, UK	Continuation of the summit
2022	Climate Change Summit	London, UK	Further discussions on climate
2023	Climate Change Summit	London, UK	Addressing the need for action
2024	Climate Change Summit	London, UK	Key event in the 2020s