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Dean's Office
College of Natural Science & Mathematics

NEW DEGREE PROGRAM REQUEST
Graduate Certificate in Science Teaching and Outreach

Cover Memorandum

A. Proposal prepared by:
Richard Boone, Professor, Dept. of Biology and Wildlife
Laura Conner, Research Assistant Professor and Director of CNSM outreach
Sarah Fowell, Associate Professor and Chair of Dept. of Geology and Geophysics
Denise Kind, Instructor, Dept. of Biology and Wildlife
Christa Mulder, Professor and Chair of Dept. of Biology and Wildlife

B. We hereby propose a new graduate certificate in Science Teaching and Outreach, to be offered at the University of Alaska Fairbanks. Many science graduate students

[redacted]

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IDENTIFICATION OF THE PROGRAM

A. Description of the Program

Program title: Graduate Certificate in Science Teaching and Outreach

Credential level of the program: Graduate Certificate (12-29 credits are required for graduate certificates. This certificate will require 12 credits). (**Note**: This program is NOT related to a state teaching certificate and earning this certificate does not enable the graduate to teach K-12 in a certified position)

Admissions requirements and prerequisites: Applicants must follow the admission requirements of the UAF Graduate School.

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STO 602 Mentoring in the Sciences (currently BIOL692)
2 credits

Proposed general catalog layout copy:

Graduate Certificate in Science Teaching and Outreach

The certificate in science teaching and outreach is a voluntary program that prepares science graduate students for sciencncTomeaching. 0 0 16Tw 2.54 0 Td (a)Tj.2426 0 Td (C)Tj -0.

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Award and attended the National Academies Summer Institute on Undergraduate Education in Biology. Sarah leads annual training sessions for graduate teaching assistants on methods of instruction and holds regular faculty tutorials on the use of automated response systems and design of "clicker questions". As Chair of the Dept. of Geology & Geophysics, she strongly supports programs that provide opportunities for graduate students develop their pedagogical skills. Sarah will continue to co-teach STO 666, Scientific Teaching.

Denise Kind, Term Instructor, Biology and Wildlife

Denise received her PhD in Population Genetics and Evolutionary Biology from the University of California Irvine in 2005. She has taught several courses since then, including repeated offerings of Biology and Wildlife's Fundamentals of Biology sequence (BIOL 115X/116X) and Methods in Scientific Teaching (BIOL/CHEM/GEOS 692). She was originally trained in instructional methods during her graduate studies at UCI, and holds a secondary teaching certificate in the State of Alaska. She has participated in and led teaching workshops for faculty and graduate students and has been involved in organizing a non-credit discussion group that is the predecessor of the pr(s)Tj 0.4 0 Td (e)Tj 0.404 Tc 0.004

ENROLLMENT INFORMATION

A. Projected enrollment/present enrollment

Two of the proposed core courses for the certificate, “Scientific Teaching” and “Communicating Science,” have enjoyed relatively high enrollments for graduate courses since their inception. In the case of Scientific Teaching, which was established in response to student demand, the course enrolled 20 the first time it was offered, 8 the second time it was offered, and 5 the third time it was offered. The declining enrollments appear to be the result of depletion of the current pool of interested students; in the second year it was taught, it received very high IAS scores. We expect that if it is offered every other year, it will have a typical enrollment of 8-12 students. Enrollment for Communicating Science is more complex—the course is currently a requirement for NSF-funded fellows in the GK-12 fellowship program, so some of the enrollment reflects this requirement. In Year 1, the course enrolled 16 students, 10 of whom were required to take the course. In Year 2, the course enrolled 13 students, 10 of whom were required to take the course. The GK-12 program attracts many of the same students that would be likely to enroll in a certificate program, but it is unrealistic to expect that enrollment would be maintained at 13-16 yearly without the requirement. However, 9 out the 13 students currently enrolled report that they would have taken the course even in absence of the GK-12 requirement (determined by anonymous written survey).

In terms of projected enrollment for the certificate program as a whole, comparative numbers from other institutions that offer such certificates are likely the strongest metric. As indicated below in “Need for Program,” a number of certificate programs such as the one proposed are increasingly offered at universities and colleges around the country (data from Grasgreen 2010). For comparative purposes, 386 students were enrolled in the University of Michigan’s certificate program as of 2010. This number represents about 3% of the overa

C. Maximum enrollment which program can accommodate
Based on a maximum course size of

OTHER

For the K-12 track and the informal education track of the proposed internship, graduate students will be placed with the F

B. Facilities/space needs

No new facilities are needed for this certificate. All of the courses within the certificate are already taught, have been taught within the past few years, or would have been taught as part of regularly planned programming within the next year (e.g., PHYS 6XX) regardless of whether the certificate exists. These courses can all be accommodated in existing classroom spaces. No lab spaces are needed for these courses. The administrative offices used for the program are already allocated to the Director of CNSM Outreach and the CNSM Outreach Administrative Assistant.

C. Credit hour production

Because some courses are taught every other year, and some yearly, the credit hours produced in the program vary slightly from year to year. We anticipate that in Year 1, with 6 students enrolled in the program, 72 credit hours will be produced. In subsequent years, we estimate that this figure would double, for a total of 144 credit hours. These figures exclude credit hours produced from additional individuals taking some of the courses that are not enrolled in the program.

D. Faculty

RELATION OF PROGRAM TO OTHER PROGRAMS WITHIN THE SYSTEM

A. Effects on enrollments elsewhere in the system

The courses within the certificate are currently offered with discipline-specific designators, or cross listed between several disciplines. If these designators are kept as they are, it is possible that,yrs, mc 0 Tw 2.74 0 Td 1ay8e(o tw 4 0 Td (2 ( )Tj 0.24 0 Td

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Projected Annual Revenues in FY 15	Projected Annual Expenditures in FY 15
Unrestricted	

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9. Projected enrollments (headcount of majors). If this is a program deletion request, project the teach out enrollments.

Year 1: 6	Year 2: 12	Year 3: 12	Year 4: 12

Page number of attached summary where demand for this program is discussed: 12

10. Number* of new TA or faculty hires anticipated (or number of positions eliminated if a program deletion):

Graduate TA	
Adjunct	
Term	
Tenure track	

11. Number* of TAs or faculty to be reassigned:

Graduate TA	
Adjunct	
Term	
Tenure track	

Program Affected	Anticipated Effect	Program Affected	Anticipated Effect

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☐ Recommend Approval ☐ Recommend Disapproval	_____	_____
	UA President	Date
☐ Approved ☐ Disapproved	_____	_____
	Chair, Board of Regents	Date

*Net FTE (full-time equivalents). For example, if a faculty member will be reassigned from another program, but his/her original program will hire a replacement, there is one net new faculty member. Use fractions if appropriate. Graduate TAs are normally 0.5 FTE. The numbers should be consistent with the revenue/expenditure information provided.

Attachments: ☐ Summary of Degree or Certificate Program Proposal ☐ Other (optional)

Prospectus for Graduate Certificate in Science Teaching and Outreach

University of Alaska Fairbanks

A. Mission and Goals:

We hereby propose a new graduaisdiomtb(ye)Tj 0.26 0W[d ( )Tj 0.26 0 Td (n)Tj j 0.022 d (n)Tj T

undergraduates. The internship component of the proposed certificate will allow graduate students to link their research to university-level teaching and/or community engagement. In addition, the Vision 2017 Task Force recommends, among other things, that UAF "significantly expand internships, externships, and practicum opportunities for all students," and that UAF "emphasize development of career and employability skills throughout the UAF curriculum…" This certificate will allow graduate students to deeply explore and gain hands-on experience with teaching. Earning such a certificate will make graduate students more marketable in the highly competitive job markets they will enter.

C. Educational Offerings:

1. Descriptive information of the educational offering(s):

Graduate Certificate in Science Teaching and Outreach

The certificate in science teaching and outreach is a voluntary program that prepares science graduate students for science careers that include teaching and/or communicating science to the public. It does NOT meet the requirements for earning a state teaching certificate and will not allow graduates to apply for certified positions in the K-12 school system. Such training will enhance readiness for college-level teaching by providing hands-on training and familiarity with pedagogical theory. The certificate is expected to increase competitive abilities

1 credit

PROGRAM TOTAL: 12 credits

2. Evidence of approval by the appropriate academic policy body of the institution:

Senate signature page and BOR approval from the minutes will be provided by the Office of the Provost.

D. Planning:

1. Evidence of need for the change and the students to be served:

The need for improvements in how science and engineering graduate students are trained with respect to teaching and mentoring is well-documented (e.g. Committee on Graduate Education, 1998). Despite the multifaceted nature of responsibilities graduate students will have in their careers, most graduate programs in the sciences have not traditionally offered explicit training in teaching and mentoring (Pruitt-Logan et al. 2002). However, this trend is changing—as of 2009, about 45 institutions offered the option of earning a certificate in college teaching to their graduate students (Border and vonHoene, 2010). Some programs focus explicitly on preparing STEM faculty, while other programs are offered across disciplines. Science graduate students at other institutions who have participated in professional development programs related to teaching and learning have reported that their participation resulted in greater knowledge about teaching and learning, and a better understanding of faculty roles, compared to peers who have not had such training (Pruitt-Logan et al. 2002). Such training may enhance a candidate's marketability in higher education and in other science and engineering careers— in a national survey, hiring departments in a broad range of institutions placed high value on teaching readiness, as indicated by college-level teaching credentials (Benassi et al. 2001).

In addition, the certificate will prepare participants (in part) for the service component of faculty and other professional positions by requiring students to work with K-12 and public audiences. This experience should also increase student's ability to create meaningful broader impacts projects for federally funded grant proposals. Finally, participation in the coursework leading to the certificate is expected to have a direct impact on teaching skills in the short term. Because many science graduate students serve as teaching assistants, this is expected to have positive outcomes for undergraduates taking science courses at UAF.

2. The procedures used in arriving at the decision to change[1]:

The desire for science graduate teaching training at UAF initially came from the graduate students themselves. In order to address the demand for such training, several CNSM departments launched the cross-listed course "Scientific Teaching." This course and its sister course, "Communicating Science," have enjoyed relatively high enrollments for graduate courses since their inception. The demand for such courses, coupled with the desire to remain competitive with other universities that offer such training through a formal certificate, led to interdepartmental conversations among CNSM faculty about the possibility of offering such a certificate at UAF. The idea was discussed among CNSM department chairs and with the dean, all of whom concurred that a certificate offering would be beneficial for our science graduate students.

3. The organizational arrangements that must be made within the institution to accommodate the change[2]:

The courses that will be part of the cer a

Student services is concerned with the recruitment, retention, and success of our students. A growing number of universities are offering certificates such as the one proposed here to their graduate students. The certificate could serve as an additional recruitment tool for entering graduate students, and is expected to enhance success in the job market post-graduation.

G. Physical Facilities:

No new spaces are needed for this program. All of the courses within the certificate are already taught, or would have been taught a part of regularly planned programming within the next year (e.g., PHYS 605) regardless of whether the certificate exists. These courses can all be accommodated in existing classroom spaces. No lab spaces are needed for these courses. All faculty and staff associated with the program al ac.26 0 Td (acc)v1 0 Td (ra)Tj -0.038 T

Quick guide to proposed course numb