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Submit originals and one copy and electronic copy to Governance/Faculty Senate Office (email electronic copy to fysenate@uaf.edu)

REQUEST FOR A NEW MINOR

SUBMITTED BY:

Department	SFOS	College/School	SFOS
Prepared by	Sarah Hardy	Phone	x7616
Email Contact	smhardy@alaska.edu; iken@ims.uaf.edu; clneumann@alaska.edu	Faculty Contact	Sarah Hardy or Katrin Iken

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

PROGRAM IDENTIFICATION:

TITLE OF MINOR: Marine Science

****Number of credits required for completion (minimum is 15):*** *"Unless otherwise specified by the appropriate academic unit, a course may be used more than once toward fulfilling degree, certificate, major and minor requirements. Credit hours for these courses count only once toward total credits required for the degree or certificate. Certifying that [the student has] met all major and minor requirements is the responsibility of [the student's] department faculty, who notify the Registrar's Office." From the General University Requirements section of "How to Earn a Bachelor's Degree" in the UAF Catalog.	15
Do all the required courses currently exist?	NO

If not, list the corresponding New Course paperwork associated with this request:

- MSL 211, 212, and 213L: Intro to Marine Science I and II, and Lab
- MSL 317: Introduction to Marine Mammal Biology
- MSL 330: The Dynamic Alaskan Coastline
- MSL 403: Estuaries
- MSL 412: Early Life Histories of Marine Invertebrates
- MSL 449: Biological Oceanography
- MSL 463: Chemical Coastal Processes
- FISH 440: Oceanography for Fisheries

A. DESCRIPTION OF THE PROPOSED MINOR. Include reasons justifying its creation; objectives of the minor and relationship of the required courses to those objectives.

Overview: The minor in Marine Science will be administered by the Graduate Program in Marine Science and Limnology (GPMSL) in the School of Fisheries and Ocean Sciences. The minor outlined in this proposal will be available to undergraduate students in all degree programs. It will consist of three new introductory courses that will form the "core" requirement (2 lecture courses + 1 lab course, 7 credits total) and 6 credits in electives in other marine science courses. In addition, students will choose a minimum of 2 credits of additional electives from among selected courses in Marine Science, Fisheries, Biology and Wildlife, and Economics, for a total of 15 credits required for the minor. This program was created in response to numerous requests from Fisheries, Biology and Wildlife, and Natural Resource Management students who, after taking the single undergraduate Marine Science course currently offered (MSL 111X: The Oceans), were interested in continued coursework in the field. Unfortunately, no additional options currently exist. Fisheries students are thus expected to benefit from the breadth this program will offer to their curriculum. In addition, we anticipate this program will appeal to students from other disciplines (e.g., Political Science, Earth Sciences, Biology & Wildlife, Environmental Science, Resource Management, Education) in which possible career paths may require and/or benefit from

training in marine science (policy-making, resource management, education, seafood industry, etc.).

Objective and relationship to courses proposed: This program will provide students with a marine-science knowledge base, skill set, and hands-on experience, which will augment their educational experience at UAF. This minor will strengthen the abilities of UAF graduates to address essential issues in research, education, management, administration or industry related to Alaska's marine resources. To address these objectives, the program will include a required two-semester core course with associated lab that will introduce students to the interdisciplinary field of marine science, including study of the unique physical, chemical and biological aspects of the marine environment, and the organisms that inhabit this environment. Building on this core foundation, students will be able to choose from a variety of more focused courses depending on their specific area of interest. The elective courses will provide more detailed study of marine biology and ecology, and the physics and chemistry of the oceans. Available electives will include field courses that will be taught at the UAF marine lab facility, the Kasitsna Bay Laboratory near Homer, AK, and will emphasize hands-on learning and student-centered research projects. Several elective options (e.g., Polar Marine Science, Dynamic Alaskan Coastline, Marine Biology and Ecology Field Course) will also emphasize polar regions, and Alaskan marine ecosystems in particular.

Undergraduates that have completed the minor in Marine Science will possess a knowledge base and skill set that will make them more competitive for a wide variety of agency and organization positions, particularly within the state of Alaska. Training provided here will be applicable in jobs with government management agencies (e.g., Alaska Department of Fish and Game, U.S. Fish and Wildlife Service), Alaska Native Organizations, non-profit conservation organizations, seafood industry, or in other policy-development, fisheries, education, or outreach capacities.

B. PROPOSED MINOR REQUIREMENTS AS THEY WILL APPEAR IN THE CATALOG:

Samples provided on page 2 of this form.

1. Students *must* complete the following (7 credits):

MSL 211 – Introduction to Marine Science I (3 credits)
MSL 212 – Introduction to Marine Science II (3 credits)
MSL 213L—Marine Science Laboratory (1 credit)

2. Students *must* complete *at least* 6 credits from the following:

MSL 317 – Introduction to Marine Mammal Biology (3 credits)
MSL 330 —The Dynamic Alaskan Coastline (3 credits)
MSL 403— Estuaries (2 credits)
MSL 412 —Early Life Histories of Marine Invertebrates (3 credits)
MSL 431 – Polar Marine Science (3 credits)
MSL 449 – Biological Oceanography (3 credits)
MSL 463 – Chemical Coastal Processes (3 credits)

3. Students *may* complete at least 2 credits from the following:

Marine Science and Limnology

MSL 220 – Scientific Diving (2 credits)
MSL 421 – Field Course in Subtidal Studies (2 credits)
MSL 450 – Marine Biology and Ecology Field Course (4 credits)
MSL 456 – Kelp Forest Ecology
MSL 497 – Marine Field Experience (Independent Study) (1-2 credits)

Fisheries
FISH 288/BIOL 288 – Marine and Freshwater Fishes of Alaska (3 credits)
FISH 301—Biology of Fishes (3 credits)
FISH 425 – Fish Ecology (3 credits)
FISH 440—Oceanography for Fisheries (3 credits)

Biology and Wildlife
BIOL 305 – Invertebrate Zoology (5 credits)
BIOL 473 – Limnology (4 credits)

Economics
ECON 235 – Introduction to Natural Resource Economics (3 credits)

C. ***ESTIMATED IMPACT***

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

This new program offering should not impact budgets, because all new courses created for the program will be taught by existing faculty in the School of Fisheries and Ocean Sciences. Faculty responsible for teaching the new courses proposed in conjunction with this program are mainly recent hires that will pick up additional teaching credits to fulfill their contractual teaching obligations. No unusual facilities or space are required, but the addition of several new lecture courses will impact demand for standard classroom facilities. These courses are expected to be relatively small in size and are not likely to require large lecture-hall facilities. Decisions regarding video-conferencing of specific courses will be made by the respective instructors of each course, but in general, lecture-based courses in SFOS are offered via videoconferencing to remote campuses as demand warrants. Lab-based courses cannot be offered via videoconference at this time. The required introductory lab course (MSL 213L) will require use of a teaching lab; the specific space needs for this course are currently being addressed, as outlined in the associated MSL 213 new-course paperwork (submitted concurrently with this proposal).

D. ***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 Biology and Wildlife program may be impacted by increased enrollment in BIOL 305 and BIOL 473. The department chair, Christa Mulder, was consulted in Nov. 2010, and it was agreed that increased enrollment would not negatively impact or overburden the BIOL program. Similarly, the Fisheries undergraduate program, which is also based in SFOS, may experience higher enrollment in the elective courses listed above. However, one of the main motivating factors for the creation of this minor is to broaden the opportunities available to students in the fisheries program who currently do not benefit from the expertise available among the marine science faculty. Thus, impacts on the fisheries program are also expected to be positive. Fisheries program head Trent Sutton was contacted in Nov 2010, and approved the listing of FISH 288 and 425 as electives. Economics program head Greg Goering was also contacted in Nov. 2010 regarding the listing of ECON 235 as an elective for this program, and gave his approval given the relatively minor impacts predicted for the ECON program.

F. ***PERSONNEL DIRECTLY INVOLVED WITH THE MINOR:***

List faculty currently teaching the required and elective (if any) courses, with a brief statement of duties and qualifications.

Existing SFOS faculty in Oceanography and Marine Biology will be directly involved in this new initiative, offering several upper-division undergraduate electives that will be stacked

with existing graduate courses, as well as creating new courses specifically for undergraduates. This program will also allow for participation of SFOS Fisheries faculty, and of faculty in other programs at UAF (Economics, Biology), and we have received support from the program heads in these units for this initiative. Listed below are the SFOS faculty in Marine Biology, Oceanography, and Fisheries and the courses they offer (or will be offering) as part of the proposed minor, as well as their areas of expertise. All are tenured or tenure-track faculty with extensive research experience in their respective fields who are currently active in graduate and/or undergraduate teaching and mentoring at UAF:

Oceanography:

Harper Simmons, Associate Professor
(MSL 211: Introduction to Marine Science I)
Physical oceanography, especially high-latitude systems

Ana Aguilar-Islas, Assistant Professor
(MSL 213L: The Oceans Lab (Fall semester); MSL 463: Chemical Coastal Processes)
Chemical oceanography, especially trace-metal biogeochemistry

Peter Winsor, Associate Professor
(MSL 213L: Marine Science Lab (Spring semester); MSL 403: Estuaries)
Physical oceanography of the Arctic seas, ocean-ice-atmosphere dynamics, freshwater dynamics

Sam VanLaningham, Assistant Professor
(MSL 320: The Dynamic Alaskan Coast)
Geology, especially sediment transport and deposition in marine environments

Jeremy Mathis, Assistant Professor
(MSL 431: Polar Marine Science)
Chemical oceanography, especially ocean carbon cycling and ocean acidification

Rolf Gradinger, Associate Professor
(MSL 449: Biological Oceanography)
Biological oceanography, Sea-ice ecology, Marine microbes and protists

Marine Biology:

Sarah Hardy, Assistant Professor
(MSL 212: Introduction to Marine Science II; MSL 412: Early Life Histories of Marine Invertebrates)
Biological oceanography, biology of marine invertebrates, benthic ecology, polar marine ecology

Lara Dehn, Assistant Professor
(MSL 317: Introduction to Marine Mammal Biology)
Marine mammal biology and ecology

Brenda Konar, Professor
(MSL 220: Scientific Diving; MSL 421: Field Course in Subtidal Studies; MSL 456: Kelp Forest Ecology)
Biology of marine invertebrates and macroalgae, benthic ecology, scientific diving

Katrin Iken, Associate Professor
(MSL 450: Marine Biology and Ecology Field Course)
Biology of marine invertebrates and macroalgae, benthic ecology, polar marine ecology, chemical ecology

Fisheries:

Amanda Rosenberger, Assistant Professor
(FISH 425: Fish Ecology)
Fisheries ecology, conservation and management, Fish habitat
Andy Seitz, Assistant Professor
(FISH 288: Marine and Freshwater Fishes of Alaska)
Fisheries oceanography, Fish conservation, dispersal and population dynamics
Franz Mueter, Assistant Professor
(FISH 440: Oceanongraphy for Fisheries)
Commercial fisheries and management, Fish conservation, Fisheries oceanography, Fish population dynamics
Andres Lopez, Assistant Professor
(FISH 301: Biology of Fishes)
Fish taxonomy, Fisheries genetics and aquaculture

Biology and Wildlife:
Jay Jones, Associate Professor
(BIOL 473: Limnology)
Biogeochemistry, structure and function of stream ecosystems
Derek Sikes, Assistant Professor/Curator of Insects, UAF Museum of the North
(BIOL 305: Invertebrate Zoology)
Insect taxonomy, phylogenetics, and conservation

Economics:
Josh Greenberg, Associate Professor
(ECON 235: Introduction to Natural Resource Economics)
Agricultural and resource economics, including commercial fisheries

G. RELATIONSHIP OF THE PROPOSED MINOR'S OBJECTIVES TO THE "PURPOSES OF THE UNIVERSITY".

Include additional justifying information to support creation of the minor such as projected and present enrollments; need or public demand for the minor; support of other programs by the minor's creation, etc.

The objectives of the minor in Marine Science coincide with the UAF academic mission of providing high-quality education to undergraduates, because the minor will offer a suite of courses to augment student expertise in the natural sciences and resource management, and enable students seeking a career in fisheries or oceanographic research. Thus, the program addresses three core mission areas identified in the UAF strategic plan: Serve students; Provide quality educational opportunities and experiences; Be responsive to the needs of the state of Alaska.

Fisheries majors are expected to receive immediate benefits from this program, and many have expressed interest in additional MSL course offerings being made available to them. The Fisheries program has been growing rapidly over the last several years, with 68 students currently enrolled and numbers projected to increase to 70-80 in the next year. We also expect the program will serve students in other disciplines such as resource management and political science, as described in the sections above, and we intend to advertise the program to draw in students from these other fields.

APPROVALS:

Signature, Chair, Program/Department of:		Date	17 Dec 10
	GPMSL		
Signature, Chair, College/School Curriculu Council for:		Date	01/03/11
	SFOS		
Signature, Dean, College/School of:		Date	1/18/11
	SNMS		

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

Signature, Chair, UAF Faculty Senate Curriculum Review Committee		Date	

Final approval will be at the level of the Chancellor or Chancellor's Designee, following vote of approval by the Faculty Senate.

Curriculum Committee SFOS

Members: Trent Sutton (Chair)
Katrin Iken
Jeremy Mathis
Andre Lopez

08 December 2010

New Minor
Minor Title: Marine Science
Instructor: Hardy
First Time of Offering: Yes

General Recommendations:

General question – will courses be video conference to rural locations (e.g., Juneau, Anchorage, etc.) where there are UAF undergraduates?

Faculty Senate Form:

Clarify and Address the following:

- For MSL 412, please capitalize all words as for other courses? Also, list FISH 301 and FISH 440 as these are new courses that should be added to the electives.
- For the overview, replace "...BA and BS..." with ..., Biology and Wildlife, and NRM undergraduate...".
- For the proposed minor requirement, add FISH 301 and FISH 440 to the list. Christina Neumann has course titles and other information for these courses, including the instructors.
- Estimated impact – Demand for video conference rooms and demand for lab space for MSL 213L. Specifically, what lab space is available for MSL 213L?
- For personnel, first line, add Biology/Wildlife and Economics as their faculty will be involved in teaching courses in the minor as well. Will need to include those individuals and the courses they will teach. Same for FISH 440 (Mueter) and FISH 301 (Lopez).
- Section G. Currently, 68 fisheries undergraduates with a target between 70-80 students next year. One hundred undergraduates in the Fisheries program is not sustainable. Should also include somewhere in this section Biology/Wildlife and NRM undergraduates because they are part of your target audience as well.