PROGRAM / DEGREE REQUIREMENT CHANGE MAJOR MINOR

SUBMITTED BY:
Department: Fisheries Division
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See http://www.uaf.edu/uafgov/faculty/og for a complete description of the rules governing curriculum & course changes.

PROGRAM IDENTIFICATION:

DEGREE PROGRAM:

Fisheries Science

Degree Level: (i.e., Certificate, A.A., A.A.S., B.A., B.S., M.A., M.S., Ph.D.) B.S.

A. CHANGE IN DEGREE REQUIREMENTS: Brief statement of program (degree changes and objectives)

Changed FISH 315 (Fisheries Techniques, 4 credits) to FISH 315 (Freshwater Fisheries Techniques, 3 credits)

Added 1 credit to upper division credits of other electives (change from four to five credits) in order to maintain degree credits at 126.

B. CURRENT REQUIREMENTS AS IT APPEARS IN THE CATALOG:

1. Complete the general university requirements. (As part of the core curriculum requirements, complete MATH F200X or F272X.)

2. Complete the B.S. degree requirements. (As part of the B.S. degree requirements, complete STAT F401 or STAT F402.)

3. Complete the following fisheries core requirements:
   - BIOL F115X—Fundamentals of Biology I**—4 credits
   - BIOL F116X—Fundamentals of Biology II**—4 credits
   - BIOL F271—Principles of Ecology—4 credits
   - BIOL F310—Animal Physiology—4 credits
   - BIOL F362—Principles of Genetics—4 credits
   - BIOL F473W—Limnology (4)
     or MSL F411—Current Topics in Oceanographic Research (3)
     or BIOL F476—Ecosystem Ecology (3)
     or BIOL F483—Stream Ecology (3)—3 - 4 credits
   - CHEM F105X—General Chemistry**—4 credits
   - CHEM F106X—General Chemistry**—4 credits
   - ECON F200—Principles of Economics (4)
     or ECON F235—Introduction to Natural Resource Economics (3)
     or ECON F201—Principles of Economics I: Microeconomics (3)
     and ECON F202—Principles of Economics II: Macroeconomics (3)
   - ENGL F414W—Research Writing (3)—3 - 4 credits
   - FISH F101—Introduction to Fisheries—3 credits
   - FISH F288—Marine and Freshwater Fishes of Alaska—3 credits
   - FISH F315—Fisheries Techniques—4 credits
   - FISH F425—Fish Ecology—3 credits
   - FISH F427—Icthyology—4 credits
   - FISH F490—Experiential Learning Internship—1 credit
   - FISH F487W,O—Fisheries Management—3 credits
   - MSL F111X—The Oceans**—4 credits
   - PHYS F103X—College Physics**—4 credits
STAT F200X—Elementary Probability and Statistics—3 credits
STAT F401—Regression & Analysis of Variance—4 credits
   or STAT F402—Scientific Sampling—3 credits

4. Complete 12 credits of electives* from Fisheries, Biology or Natural Resource Management
   (of which 7 credits must be upper division).

5. Complete 4 credits of electives* from Chemistry, Geology or Physics.

6. Complete 4 upper-division credits of other electives*.

7. Minimum credits required—126 credits

C. PROPOSED REQUIREMENTS AS THEY WILL APPEAR IN THE CATALOG WITH THESE CHANGES:
Underline new wording strike through old wording and use complete catalog format.

1. Complete the general university requirements. (As part of the core curriculum requirements,
   complete MATH F200X or F272X.)

2. Complete the B.S. degree requirements. (As part of the B.S. degree requirements, complete
   STAT F401 or STAT F402.)

3. Complete the following fisheries core requirements:* 
   BIOL F115X—Fundamentals of Biology I**—4 credits 
   BIOL F116X—Fundamentals of Biology II**—4 credits 
   BIOL F271—Principles of Ecology—4 credits 
   BIOL F310—Animal Physiology—4 credits 
   BIOL F362—Principles of Genetics—4 credits 
   BIOL F473W—Limnology (4)
      or MSL F411—Current Topics in Oceanographic Research (3)
      or BIOL F476—Ecosystem Ecology (3)
      or BIOL F483—Stream Ecology (3)—3 – 4 credits
   CHEM F105X—General Chemistry**—4 credits
   CHEM F106X—General Chemistry**—4 credits
   ECON F200—Principles of Economics (4)
      or ECON F235—Introduction to Natural Resource Economics (3)
      or ECON F201—Principles of Economics I: Microeconomics (3)
      and ECON F202—Principles of Economics II: Macroeconomics (3)
   ENGL F414W—Research Writing (3)—3 – 4 credits
   FISH F101—Introduction to Fisheries—3 credits
   FISH F288—Marine and Freshwater Fishes of Alaska—3 credits
   FISH F315—Freshwater Fisheries Techniques—4 3 credits
   FISH F425—Fish Ecology—3 credits
   FISH F427—Ichthyology—4 credits
   FISH F490—Experiential Learning Internship—1 credit
   FISH F487W,O—Fisheries Management—3 credits
   MSL F111X—The Oceans**—4 credits
   PHYS F103X—College Physics**—4 credits
   STAT F200X—Elementary Probability and Statistics—3 credits
   STAT F401—Regression & Analysis of Variance—4 credits
      or STAT F402—Scientific Sampling—3 credits

4. Complete 12 credits of electives* from Fisheries, Biology or Natural Resource Management
   (of which 7 credits must be upper division).

5. Complete 4 credits of electives* from Chemistry, Geology or Physics.

6. Complete 4 upper-division credits of other electives*. 
7. Minimum credits required—126 credits

D. ESTIMATED IMPACT

WHAT M FACT, F ANY, W ITH E HAVE ON BUDGET, FACILITIES/S PACE, FACULTY, ETC.

There will be no impact on the budget, facilities/space, or faculty regarding this change. Trent Sutton will teach the course as part of his workload agreement. The SFOS Academic Programs Office manages the academic budget that provides the funds for this course. By teaching the course as a Maymester class, the budget needs will be lower because field trip costs will be reduced due to consolidated trips. There will be no change in needs for lab facilities and space.

E. IMPACTS ON PROGRAM/DEPTS:

What programs/Departments will be affected by this proposed action?
Include information on the Program/Departments contacted (e.g., all, some, none)

No other programs will be affected by this change.

F. IMPACT Change - ASSESSMENT OF THE PROGRAM:

Description of the student learning outcomes assessed process.

There will be no change to the student learning outcomes. I have provided those below as they currently exist.

The Fisheries faculty in the School of Fisheries and Ocean Sciences have identified the following general and specific learning/educational outcomes for the B.S. in Fisheries degree program. The following attributes will be documented as part of a checklist to track student progress and individual change as they progress through the program. The outcomes stated below are consistent with attributes that are sought by employers of students from our program based on a survey of industry and agency professionals completed in Fall 2006/Winter 2007.

Undergraduate Educational Outcomes
Bachelor of Science - Fisheries

1. Have an understanding of the biology of fishes and other aquatic organisms, including their ecology, evolution, morphology, physiology, and classification. An emphasis should be placed on the functional role of these organisms in terrestrial and aquatic ecosystems.
2. Have an understanding, assessment, and application of management and conservation strategies for fish and aquatic organism populations and communities, as well as their associated ecosystems, habitats, and human users.
3. Have the ability to design the collection of field and laboratory data and samples and analyze and interpret the resulting information using appropriate statistical and computer applications.
4. Have the ability to critically review and evaluate field and laboratory data and make appropriate conclusions about the use of this information that allows for science-based decision making.
5. Have the ability to effectively communicate with other professionals and laypersons using written, oral, listening, and technological skills.
6. Have an understanding of and appreciation for the influence of human wants and desires on the conservation and management of fisheries and aquatic organism resources, including social, political, economic, and legal aspects of natural resource conservation.
7. Have an understanding of our diverse world and how humans and natural resources are interconnected with other parts of Alaska, North America, the biosphere, and all peoples inhabiting those areas.
8. Have an understanding of how natural and anthropogenic stressors affect natural resources in aquatic ecosystems.
9. Have an understanding of social responsibility, the ethical use of natural resources, and our obligations as stewards of the planet.
10. Have an understanding that humans have a right and responsibility to evaluate and embrace change by critically reviewing the effects of information and technology as they relate to natural resources and the world.
11. Have the ability to effectively work in situations that require teaming and leadership skills.
12. Have an appreciation for and understanding of the need for lifelong learning and developing professional skills.

Fisheries Program Core Areas

Fish Ecology and Life History

1. Develop an appreciation for the diversity of responses by individual fish to environmental variability and the consequences of individual adaptation for population and community persistence in freshwater and
2. Identify the relationship of fishes in freshwater and marine ecosystems to the physical, chemical, and biological features of their environment in both perturbed and unperturbed aquatic environments.

3. Develop an understanding of fish and aquatic invertebrate diversity in terms of morphology, behavior, feeding, and reproductive strategies and habitat selection as they relate to individual and population adaptation, and community structure in both freshwater and marine environments.

4. Understand the elementary principles of fish population dynamics and response strategies to biotic and abiotic features of the environment.

5. Identify the limits of ecological adaptation in the development of alternative fisheries management strategies.

6. Develop critical thinking, written and oral communication, and professional skills as they relate to ecological theory within the context of fisheries biology and management.

Fisheries Management

1. Understand the need for managing aquatic natural resources within the context of historical changes to land-use patterns and practices in North America.

2. Develop an understanding of the basic principles and strategies utilized to assess and manage aquatic habitats and recreational and commercial fish populations, particularly those within inland freshwater environments of North America.

3. Identify the impacts that human user and non-user groups have on aquatic natural resources in North American freshwater and marine ecosystems.

4. Understand the theory and practice of fisheries management, with an emphasis on strategies utilized for the management of freshwater and marine fisheries.

5. Describe quantitative methodologies for the assessment and manipulation of aquatic habitats, sport and commercial fish populations, and human resource user and non-user groups.

6. Develop practical experience in fishery-resource assessment, data analysis and reporting, and decision making as it pertains to fisheries biology and management issues and scenarios.

7. Identify and describe appropriate goals, objectives, strategies, and assessment techniques for effective, science-based management of freshwater and marine fish populations.

8. Develop critical thinking, written and oral communication, and professional skills relative to fisheries biology and management resource issues.

Aquatic Sampling Techniques and Data Analysis

1. Develop a basic understanding of laboratory and field sampling methods in aquaculture, limnology, and fisheries biology.

2. Develop knowledge of the basic principles and techniques associated with hatchery and freshwater fish culture systems, including:
   a. Laboratory care and handling of fish
   b. Fish health assessment
   c. Water quality in culture systems
   d. Reproductive biology
   e. Types and operation of fish culture systems.

3. Develop knowledge of the basic principles and techniques associated with the assessment of physical habitat, water quality, and lower trophic levels in lentic and lotic environments, including:
   a. Physical habitat features
   b. Water quality
   c. Compass use, orienteering, and triangulation
   d. Use of topographic maps
   e. Use of GPS and GIS within the context of habitat evaluation
   f. Sampling and identification of aquatic plants and invertebrates.

4. Develop knowledge of the basic principles and techniques associated with the assessment of fish populations in lentic and lotic environments, including:
   a. Field care and handling of fish
   b. Marking and tagging of fishes
   c. Internal and external anatomy of fishes
   d. Assessment of fish populations using biotelemetry and underwater acoustics
   e. Collection of fishes using electrofishing equipment, and passive and active sampling gears
   f. Collection of aquatic invertebrates, aquatic vertebrates, plants, and algae using passive
and active sampling gears.

5. Understand the proper care and use of laboratory equipment and field sampling gears used in aquatic ecosystems and hatchery environments.
6. Explain the sampling protocols required for collecting representative, non-biased fisheries and aquatic sciences data.
7. Develop practical experience in aquatic resource assessment, data analysis and reporting, and decision-making as it pertains to the sampling and management of fish culture systems and aquatic ecosystems.
8. Develop critical thinking, written and oral communication, and professional skills relative to fisheries and aquatic science sampling considerations and issues.

Fisheries Genetics
1. Explain the basic structure and function of genes and genome organization.
2. Describe evolutionary processes that can and have shaped variation in the fishes (e.g., natural selection, genetic drift, adaptation, evolutionary/population genetics).
3. Explain why gene products are required for development, homeostasis, and reproduction
4. Describe the basic "gene pool", i.e., the collective genetic diversity found within a population or species.
5. List how routine management activities and fisheries practices (e.g., harvesting, stocking, translocations, and aquaculture) can affect gene pools.
6. Explain the role of genetic diversity in conservation programs and extinction processes.

Aquatic Animal Physiology
1. Understand the challenges associated with living underwater, including the physical and chemical differences between air and water.
2. Understand respiration underwater including the variable nature of dissolved gases and the effects of those varying concentrations.
3. Understand the cardiovascular system of fishes.
4. Understand osmoregulation in aquatic organisms.
5. Understand the effects of stress on physiology of fishes, including methods to reduce stress.
6. Understand the basics of endocrinology in fish physiology including the hormonal changes associated with reproduction and stress.
7. Understand the influence of environmental perturbations (e.g., habitat degradation, environmental contaminants) on the physiological and endocrinological function of fishes.

Aquatic Ecology
1. Understand the physical, chemical, and biological components of fresh waters, especially the factors that influence the distribution and abundance of aquatic organisms including lower trophic levels, within the context of watershed ecology.
2. Identify and understand the biology and ecology of aquatic plants, algae, and aquatic organisms at lower trophic levels (i.e., zooplankton, aquatic insects, and crayfishes).
3. Understand how the organisms and abiotic environment interact to determine ecosystem function.
4. Understand the impacts of human activities and land-use practices on the structure and function of aquatic ecosystems.
5. Understand the practical application of ecological theory to the management and restoration of lotic and lentic ecosystems.
6. Integrate advances in hydrology, landscape ecology, and spatial analysis to predict relationships between land-use, flow, and stream community responses.
7. Gain knowledge of the principles and techniques for restoring aquatic systems within watersheds.

JUSTIFICATION FOR ACTION REQUESTED

The purpose of the degree and course/curriculum changes is to scrutinize program degree change 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. If you drop a course, is it because the material is covered elsewhere? 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 program is not compromised as a result.

We are changing FISH 315 from a 4 to a 3 credit class in order to offer it as a Maymester course. Due to the reduction in one credit, we added one credit to the upper division credits category in order to maintain the B.S. in Fisheries Science degree program at 126 credits.
APPROVALS:

Signature, Chair, Program Department:       Date: 11/12/2009
Undergraduate Fisheries Coordinator, Fish Div.

Signature, Chair, College/School Curriculum Council: Date: 11/12/2009
SPoS Curriculum Committee

Signature, Dean, College/School:               Date: 12 Nov 09

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

Signature, Chair, UAF Faculty Senate Curriculum Review Committee

Date: