**Fisheries (FISH)**

**FISH F100**  
Skeleton Articulation as an Introduction to Marine Conservation Biology  
2 Credits  
Offered Spring  
Course designed for high school students.  
**Prerequisites:** GPA of 2.5 or higher; offered to high school juniors and seniors with at least 1 biology and 1 math class completed.  
**Lecture + Lab + Other:** 1 + 3 + 0

**FISH F101**  
Introduction to Fisheries  
(a)  
3 Credits  
Offered Fall  
This course surveys principles and fields of study that fisheries resource professionals use as a guide in their careers, including basic concepts associated with fish biology and fisheries management and the application of these concepts to solve complex fisheries problems. The course explores contemporary fisheries resource issues within and beyond Alaska's borders, human values associated with fish management and conservation, and the importance of fish resources for the world's economies and cultures.  
**Lecture + Lab + Other:** 3 + 0 + 0

**FISH F102**  
Fact or Fishin': Case Studies in Fisheries  
1 Credit  
Offered Fall  
This seminar will promote active learning, critical thinking, and problem solving through a series of case studies involving current issues in fisheries conservation and management. Students enrolled in this course will also receive instruction on fundamental skills required to successfully complete a four-year degree at UAF. Attendance is mandatory.  
**Lecture + Lab + Other:** 1 + 0 + 0

**FISH F103**  
The Harvest of the Sea  
2 Credits  
Offered Spring  
This course will explore the scientific and popular literature related to the exploitation of global marine fisheries resources. Specific topics of the course will be based on three core themes: (1) early exploitation of marine resources, leading to the need for fisheries management; (2) overexploitation of fish and marine mammal stocks driven largely by technological advancements culminating from the industrial revolution; and (3) the current status and future sustainability of marine fisheries resources. This course is largely discussion based; as a result, weekly attendance and preparation is a critical component of the course.  
**Prerequisites:** FISH F102; FISH F110; placement in WRTG F111X.  
**Lecture + Lab + Other:** 2 + 0 + 0

**FISH F110**  
Fish and Fisheries in a Changing World  
3 Credits  
Offered Fall  
This course is an exploration of the patterns of fish diversity, and the resilience and sustainability that results. The topics that we will cover are intended to act as foundational principles that fisheries resource professionals will use throughout their careers. Together we will examine the complexity of what constitutes a "fishery" and better understand the factors that have led some fisheries to collapse and others to persist. In addition to lectures, students will read, discuss and write extensively and by doing so, can expect to gain better understanding of the "science of sustainability" with regards to 21st century fisheries in Alaska and beyond.  
**Lecture + Lab + Other:** 3 + 0 + 0

**FISH F192**  
Seminar  
1-6 Credits  
**Lecture + Lab + Other:** 0 + 0 + 0

**FISH F261**  
Introduction to Fisheries Utilization  
(a)  
3 Credits  
Offered Fall  
Application of harvesting, processing, preservation and marketing of Alaska's rich fisheries resources. Core course requirement for all B.A. students completing a minor in fisheries and for B.S. fisheries students. Course is offered via videoconference.  
**Prerequisites:** BIOL F103X or CHEM F100X or permission of instructor  
**Lecture + Lab + Other:** 3 + 0 + 0

**FISH F288**  
Fish and Fisheries of Alaska  
(a)  
3 Credits  
Offered Spring  
This course will provide mid-level undergraduate students with an introduction to the biology and fisheries of Alaskan fish, shellfish and marine mammals, with important finfishes as the main focus of the course. First, we will examine important recreational, subsistence and commercial shellfish and finfish species. Next we will briefly cover fisheries economics and then turn our attention to lesser known freshwater and marine mammal fisheries in Alaska. The amount of coverage of each topic will vary depending on what is known about each group of organisms. Before enrolling students should have a basic understanding of biological and ecological concepts. This course is required of all fisheries students but should appeal to anyone interested in Alaska's fish and fisheries.  
**Prerequisites:** FISH F110; or permission of instructor.  
**Lecture + Lab + Other:** 3 + 0 + 0

**FISH F290**  
Fisheries Internship  
(a)  
1 Credit  
Under the supervision of a fisheries professional, students gain practical, professional experience through employment. Can be repeated up to four times, each for a different type of employment. The primary learning objectives for students are to gain professional experience in fisheries and refine career goals.  
**Prerequisites:** Permission of the Fisheries Experiential Learning Coordinator/instructor; a student internship agreement form turned into the Experiential Learning Coordinator.  
**Recommended:** STAT F200X.  
**Lecture + Lab + Other:** 0 + 0 + 1-4

**FISH F292**  
Seminar  
1-6 Credits  
**Lecture + Lab + Other:** 0 + 0 + 0
FISH F301  Biology of Fishes
4 Credits
Offered Fall
A broad overview of the biological diversity of fishes presented from the comparative and organismal perspectives. The course examines the relationship between physical and biological properties of aquatic environments and the anatomy, physiology, behavior and geographical distribution of living fish lineages. Topics include fish evolution, biogeography, classification, gross and fine anatomy, sensory biology, and form-function relationships. Topics are presented to highlight essential concepts generally relevant in biology.
Prerequisites: BIOL F116X or equivalent; junior or senior standing.
Recommended: BIOL F317.
Cross-listed with BIOL F301.
Lecture + Lab + Other: 3 + 3 + 0

FISH F305  Invertebrate Zoology  (n)
4 Credits
Offered Spring Even-numbered Years
Classification, structure, function, evolution and life histories of invertebrate animals.
Prerequisites: BIOL F115X; BIOL F116X.
Cross-listed with MSL F305; BIOL F305.
Lecture + Lab + Other: 3 + 3 + 0

FISH F315  Freshwater Fisheries Techniques
3 Credits
Offered MAYmester Even-numbered Years
Introduction to laboratory and field sampling methods in aquaculture, limnology, and fisheries biology. Emphasis will be placed on the proper care and use of laboratory equipment and field sampling gears, as well as the development of sampling protocols for collecting representative, non-biased fisheries and aquatic sciences data.
Prerequisites: FISH F110; FISH F288; STAT F200X; or permission of instructor.
Lecture + Lab + Other: 2 + 3 + 0

FISH F336  Introduction to Aquaculture  (a)
3 Credits
Offered Spring Odd-numbered Years
This course is taught in Juneau. Contribution of Alaska’s aquaculture industries including salmon ocean ranching, shellfish and kelp mariculture, contribute to the world’s increasingly important aquaculture production. Survey of worldwide production, introduction to production systems, and familiarization with Alaska systems. Team taught by SFOS specialists and featuring invited lecturers, laboratory demonstrations and field trips.
Prerequisites: BIOL F115X.
Lecture + Lab + Other: 3 + 0 + 0

FISH F340  Seafood Business
3 Credits
Offered Fall
Development and management of a successful seafood business from inception to operation. Practical application of business planning, obtaining financing, accounting, permitting, feasibility analysis, marketing, human resource management, and operational aspects of seafood harvesting and processing using case studies and guest lecturers from seafood industry. FISH F261; or permission of instructor.
Lecture + Lab + Other: 3 + 0 + 0

FISH F411  Human Dimensions of Environmental Systems
3 Credits
Offered Fall
Study of human-environment relationships and applications to resource management. Draws on a range of social scientific approaches to the study of environmental systems, including: environmental anthropology, environmental history, historical ecology, political ecology, ethnoecology, property theory, and environmental justice.
Prerequisites: COJO F131X or COJO F141X; WRTG F211X or WRTG F213X; F200-level course in cultural anthropology, human geography, sociology, or political science; or permission of instructor.
Stacked with FISH F611.
Lecture + Lab + Other: 3 + 0 + 0

FISH F412  Human-Environment Research Methods
3 Credits
Offered Fall Odd-numbered Years
Overview of qualitative and quantitative social science methods for studying human-environment relationships. Introduction to research ethics, research design, data collection, data analysis and data reporting. Methods and data analysis techniques include interviews, text analysis, surveys, scales, cognitive anthropology and ethnoecology, social networks, behavioral observation, and visual methods. Provides hands-on training in data collection and data analysis software.
Stacked with FISH F613.
Prerequisites: COJO F131X or COJO F141X; WRTG F211X or WRTG F213X; upper level standing; or permission of instructor.
Cross-listed with ANTH F412.
Lecture + Lab + Other: 3 + 0 + 0

FISH F413  Marine and Freshwater Conservation Biology
4 Credits
Offered Fall Odd-numbered Years
Conservation biology is an applied science that draws from multiple disciplines to address biodiversity loss, maintenance and restoration of threatened populations and habitats. This course will examine the theory and practice of conservation biology in aquatic ecosystems across genetic, population, community and landscape scales. Using case studies, students will examine causes and consequences of biodiversity loss, extinction risk and endangered species management and the human dimensions of conservation in the U.S. and worldwide.
Prerequisites: junior or senior standing; a F200-level course in biological sciences or fisheries.
Stacked with FISH F612.
Lecture + Lab + Other: 3 + 0 + 0

FISH F414  Field Methods in Marine Ecology and Fisheries
3 Credits
Offered Alternate MAYmester
A hands-on introduction to the methods used to study ecological patterns and processes in the marine environment. Class will consist of a series of group field exercises conducted in local marine habitats. These exercises will emphasize a variety of sampling methods for documenting patterns of distribution and abundance, experimental designs for testing hypotheses and statistical interpretation of results. These skills are fundamental to most basic and applied research in marine ecology and fisheries. Thus this course provides an essential foundation for a professional career in these areas.
Prerequisites: FISH F101; BIOL F371; or permission of instructor.
Lecture + Lab + Other: 13.3 + 20 + 0
FISH F421  Fisheries Population Dynamics  
4 Credits  
Offered Fall Odd-numbered Years  
This course introduces basic ecological and fisheries stock assessment models. Through lectures, assignments and weekly computer lab, it provides a conceptual understanding of population dynamics relevant to fisheries and practice manipulating equations.  
Prerequisites: STAT F200X or equivalent.  
Lecture + Lab + Other: 4 + 0 + 0  

FISH F425  Fish Ecology  
3 Credits  
Offered Fall Odd-numbered Years  
This course in an exploration of how fish interact with, and adapt to, their physical and biological environment, taught through the viewpoint that habitat diversity acts as a template for biological diversity within and among species. We will examine the ecology of major freshwater and marine habitats (with an emphasis on the former), as well as the potential threats to these habitats from human activity.  
Prerequisites: FISH F110; BIOL F371; or permission of instructor.  
Stacked with FISH F650.  
Lecture + Lab + Other: 3 + 0 + 0  

FISH F426  Behavioral Ecology of Fishes  
3 Credits  
Offered Spring Even-numbered Years  
This course will provide upper-level undergraduate and graduate students with an advanced understanding of behavioral responses and adaptations of fishes in both freshwater and marine systems to natural and anthropogenic environmental variables. It should provide students another option to fulfill upper-level undergraduate and graduate level elective course work. Before enrolling, students should have a sound understanding of both ecological and biological concepts relating to fishes.  
Prerequisites: BIOL F371 or FISH F301 or FISH F427; or permission of instructor.  
Recommended: FISH F425; FISH F427.  
Stacked with FISH F626.  
Lecture + Lab + Other: 3 + 0 + 0  

FISH F427  Ichthyology  
4 Credits  
Offered Spring  
Major groups of fishes, emphasizing fishes of northwestern North America. Classification structure, evolution, general biology and importance to man.  
Prerequisites: BIOL F116X.  
Cross-listed with BIOL F427.  
Lecture + Lab + Other: 3 + 3 + 0  

FISH F428  Physiological Ecology of Fishes  
3 Credits  
Offered Spring Odd-numbered Years  
This course will provide upper-level undergraduate and graduate students with an advanced understanding of physiological responses and adaptations of fishes in both freshwater and marine systems to natural and anthropogenic environmental variables. It should provide students with another option to fulfill upper-level undergraduate and graduate level elective coursework. Before enrolling, students should have a sound understanding of both ecological and biological concepts relating to fish.  
Prerequisites: FISH F301 or BIOL F310 or FISH/BIOL F427; or permission of the instructor.  
Stacked with FISH F628.  
Lecture + Lab + Other: 3 + 0 + 0  

FISH F433  Pacific Salmon Life Histories  
3 Credits  
Offered Spring Even-numbered Years  
This course provides an introduction to the life histories of Pacific salmon. We will explore variation in life history traits within and among species, as well as within and among populations, at each stage of the salmon life cycle. Life histories will be understood in evolutionary and ecological contexts. We will also discuss management and conservation of Pacific salmonid species throughout their range, but with focus on Alaska. This course is taught in Juneau.  
Prerequisites: BIOL F115X, BIOL F116X or equivalent.  
Stacked with FISH F633.  
Lecture + Lab + Other: 3 + 0 + 0  

FISH F440  Oceanography for Fishery Science  
3 Credits  
Offered Fall Even-numbered Years  
Students examine how understanding the oceanographic processes that determine the distribution, recruitment, and abundance of marine vertebrates and invertebrates from global to local scales and from evolutionary time scales to daily scales supports the sustainable management of marine fisheries resources.  
Prerequisites: CHEM F105X, PHYS F103X, FISH F288, STAT F200X.  
Recommended: FISH F425.  
Cross-listed with MSL F440.  
Lecture + Lab + Other: 3 + 0 + 0  

FISH F450  Practicum in Fisheries: Fisheries Observer Program  
3 Credits  
Offered As Demand Warrants  
Practical experience as a fisheries biologist onboard an Alaska commercial fishing vessel doing independent work at sea as an agent for the National Marine Fisheries Service or the Alaska Department of Fish and Game. Simultaneous to credit, the student/observer will be under contract and receive reimbursement for deployment. May be repeated for additional credit during different deployments as observer.  
Prerequisites: STAT F200X or permission of instructor.  
Lecture + Lab + Other: 0 + 1-12 + 0  

FISH F460  Food Science and Technology Internship  
3-6 Credits  
Offered As Demand Warrants  
A combination of traditional and industrial training opportunities. Assigned required readings and discussion of appropriate topics in food science and technology. Information applied during hands-on experience in a food processing plant. Discussion includes fundamental information and solutions to industrial problems. Faculty mentor assigned to each intern. Required written evaluation of internship. 30 hours in-plant work experience for 12-24 weeks. Note: Course offered only in Kodiak.  
Prerequisites: 16 credits in natural sciences; MATH F251X or MATH F230X; or permission of instructor.  
Lecture + Lab + Other: 1 + 0 + 3
FISH F487  Fisheries Management  (O, W, n)  
3 Credits
Offered Spring
Theory and practice of fisheries management, with an emphasis on strategies utilized for the management of freshwater and marine fisheries. Application of quantitative methodologies for the assessment and manipulation of aquatic habitats, sport and commercial fish populations, and stock assessment are considered, as is the setting of appropriate goals and objectives for effective, science-based management.
Prerequisites: COJO F131X or COJO F141X; FISH F288; STAT F200X; or permission of instructor.
Stacked with FISH F687.
Lecture + Lab + Other: 3 + 0 + 0

FISH F490  Experiential Learning -- Fisheries Internship  
1 Credit
Under the supervision of a faculty member and a fisheries professional, upper-division students gain professional experience through employment. Requirements are decided prior to enrollment based on a 3-way agreement between the employer, student, and faculty member, which contains learning objectives that reflect upper-division credit. Can be repeated up to 4 times, each for a different type of employment.
Prerequisites: Junior or senior standing plus permission of Faculty Sponsor and the Fisheries Experiential Learning Coordinator/instructor (the Coordinator can be a sponsor as well); signing of a student internship agreement form that contains learning objectives for the internship that reflects upper-division internship credit.
Recommended: FISH F315; STAT F200X; STAT F401.
Lecture + Lab + Other: 0 + 0 + 1-4

FISH F492  Seminar  
1-6 Credits
Lecture + Lab + Other: 0 + 0 + 0

FISH F492P  Seminar  
1-6 Credits
Lecture + Lab + Other: 1-6 + 0 + 0

FISH F498  Senior Thesis Proposal  
2 Credits
Students will complete the first part of a year-long, self-designed scholarly project that is the capstone of a student’s exemplary academic performance. For this component of senior thesis, the student will develop a proposal that will reflect a thorough understanding of the existing literature, study objectives and testable hypotheses, the methodology by which data will be collected through field and/or laboratory research, including data analyses, and a timeline by which the senior thesis will be completed. The student should also complete the collection of field and/or laboratory data and begin data analysis.
Prerequisites: Fisheries major with senior standing; a GPA of 3.2 or higher and permission of a Fisheries Division faculty mentor and the SFOS Internship Coordinator (the coordinator may also be a mentor); STAT F200X and ENGL F414.
Recommended: FISH F315, STAT F401 or STAT F402.
Lecture + Lab + Other: 0 + 0 + 0

FISH F499  Fisheries Senior Thesis  
2 Credits
Students will complete the second part of a year-long, self-designed scholarly project that is the capstone of a student’s exemplary academic performance. For this component of senior thesis, the student will complete analysis of field and/or laboratory data collected during FISH F498 and develop a research paper/manuscript that will interpret the study results and cast them within the context of the existing literature relevant to the study topic. Students will be expected to work with their senior thesis mentor to submit the manuscript for peer review to a scientific journal and will be required to present their study results as an oral or poster presentation.
Prerequisites: Fisheries major with senior standing; with a GPA of 3.2 or higher; and permission of a Fisheries Division faculty mentor and the SFOS Internship Coordinator (the coordinator may also be a mentor); FISH F498.
Recommended: FISH F315; STAT F401; STAT F402.
Lecture + Lab + Other: 0 + 0 + 2-4

FISH F601  Quantitative Fishery Science  
3 Credits
Offered Spring Even-numbered Years
Lecture + Lab + Other: 2 + 3 + 0

FISH F603  Writing for Fisheries and Ocean Sciences Workshop  
1 Credit
Offered Spring
Skills required to prepare and present fisheries technical information in journal articles and other formats. Proficiency in writing, editing, peer reviewing written fisheries and ocean sciences communications. Requires graduate standing and requires students to write about data gathered for graduate thesis. Students bring their own research data as basis for work.
Prerequisites: ENGL F414 or ENGL F614 or permission of instructor.
Lecture + Lab + Other: 1 + 0 + 0

FISH F604  Modern Applied Statistics for Fisheries  
4 Credits
Offered Odd-numbered Years
Covers general statistical approaches to quantitative problems in marine science and fisheries with guidance on how to collect and organize data, how to select appropriate statistical methods and how to communicate results. A variety of advanced statistical methods for analyzing environmental data sets will be illustrated in theory and practice.
Prerequisites: STAT F200X; STAT F401; proficiency in computing with R or permission of instructor.
Cross-listed with MSL F604.
Lecture + Lab + Other: 3 + 3 + 0
FISH F605  Communicating Science to the Public  
2 Credits  
Offered Spring Odd-numbered Years  
In this course, students will gain practical skills in communicating their research to peers and public audiences. Short lectures, readings and discussion will focus on communication issues in environmental science and management and best practices for good oral and written communication. Throughout the semester, students will engage with professionals in science journalism, education and resource management. Students will gain direct experience in communicating science to public audiences through a group outreach event they will co-organize at the culmination of the course.  
Prerequisites: Graduate standing in the sciences; or permission of instructor.  
Lecture + Lab + Other: 2 + 0 + 0  

FISH F611  Human Dimensions of Environmental Systems  
3 Credits  
Offered Fall  
Study of human-environment relationships and applications to resource management. Draws on a range of social scientific approaches to the study of environmental systems, including: environmental anthropology, environmental history, historical ecology, political ecology, ethnoecology, property theory, and environmental justice.  
Prerequisites: Graduate standing, or permission of instructor.  
Stacked with FISH F411.  
Lecture + Lab + Other: 3 + 0 + 0  

FISH F612  Marine and Freshwater Conservation Biology  
4 Credits  
Offered Fall Odd-numbered Years  
Conservation biology is an applied science that draws from multiple disciplines to address biodiversity loss, maintenance and restoration of threatened populations and habitats. This course will examine the theory and practice of conservation biology in aquatic ecosystems across genetic, population, community and landscape scales. Using case studies, students will examine causes and consequences of biodiversity loss, extinction risk and endangered species management and the human dimensions of conservation in the U.S. and worldwide.  
Prerequisites: graduate standing; or permission of instructor.  
Stacked with FISH F413.  
Lecture + Lab + Other: 4 + 0 + 0  

FISH F613  Human-Environment Research Methods  
3 Credits  
Offered Fall Odd-numbered Years  
Overview of qualitative and quantitative social science methods for studying human-environment relationships. Introduction to research ethics, research design, data collection, data analysis and data reporting. Methods and data analysis techniques include interviews, text analysis, surveys, scales, cognitive anthropology and ethnoecology, social networks, behavioral observation, and visual methods. Provides hands-on training in data collection and data analysis software. Stacked with FISH F412  
Prerequisites: Graduate standing or permission of instructor.  
Lecture + Lab + Other: 3 + 0 + 0  

FISH F621  Estimation of Fish Abundance  
3 Credits  
Offered Fall Even-numbered Years  
Estimation of abundance of fish and other aquatic populations, using mark-recapture, line-transect, catch-effort and change-in-ratio techniques. Computer lab work and homework from actual and simulated populations.  
Prerequisites: MATH F252X; STAT F401; familiarity with PCs including word processing and spreadsheets.  
Recommended: FISH F421; MATH F302; MATH F314.  
Lecture + Lab + Other: 2 + 2.5 + 0  

FISH F622  Quantitative Fish Population Dynamics  
3 Credits  
Offered Spring Odd-numbered Years  
This course is taught in Juneau. Modeling fish population mortality, recruitment individual growth and fecundity. Models and assessment techniques for age- and length-structured populations. Biological reference points and management strategies derived from population and harvesting parameters. Computer lab work and homework with data from actual and simulated populations.  
Prerequisites: MATH F252X; STAT F401; Familiarity with PCs including word processing and spreadsheets.  
Recommended: FISH F421; MATH F302; MATH F314.  
Lecture + Lab + Other: 2 + 2.5 + 0  

FISH F625  Population Dynamics of Vertebrates  
3 Credits  
Offered Spring Odd-numbered Years  
This course is taught in Juneau. Sampling vertebrate populations, modeling their population dynamics and the implications for management. Focus will be on study design, model assumptions, estimation of population parameters and inference. State-of-the-art computer applications will be employed in laboratory exercises of actual and simulated data.  
Prerequisites: BIOL F371; STAT F401.  
Cross-listed with WLF F625.  
Lecture + Lab + Other: 2 + 3 + 0  

FISH F626  Behavioral Ecology of Fishes  
3 Credits  
Offered Spring Even-numbered Years  
This course will provide upper-level undergraduate and graduate students with an advanced understanding of behavioral responses and adaptations of fishes in both freshwater and marine systems to natural and anthropogenic environmental variables. It should provide students another option to fulfill upper-level undergraduate and graduate level elective course work. Before enrolling, students should have a sound understanding of both ecological and biological concepts relating to fishes.  
Prerequisites: BIOL F371 or FISH F301 or FISH F427; or permission of instructor.  
Recommended: FISH F425 or FISH F427.  
Stacked with FISH F426.  
Lecture + Lab + Other: 3 + 0 + 0
FISH F627  Statistical Computing with R
2 Credits
Offered Fall, As Demand Warrants
Using the free, open-source software R to teach computing, programming, and modeling concepts for the statistical computing of fisheries and biological data. Prepares students for other graduate-level, quantitative fisheries courses and covers exploratory statistical and graphical analyses, as well as computer-intensive methods such as bootstrapping and randomization tests.
Prerequisites: STAT F200X or equivalent, STAT F401 or equivalent, and proficiency with Excel; or permission of instructor.
Cross-listed with MSL F627.
Lecture + Lab + Other: 1 + 3 + 0

FISH F628  Physiological Ecology of Fishes
3 Credits
Offered Spring Odd-numbered Years
This course will provide upper-level undergraduate and graduate students with an advanced understanding of physiological responses and adaptations of fishes in both freshwater and marine systems to natural and anthropogenic environmental variables. It should provide students with another option to fulfill upper-level undergraduate and graduate level elective course work. Before enrolling, students should have a sound understanding of both ecological and biological concepts relating to fish.
Prerequisites: FISH F301 or BIOL F310, FISH/BIOL F427; or permission of instructor and graduate standing.
Lecture + Lab + Other: 3 + 0 + 0

FISH F630  Natural Resource Modeling
2 Credits
Offered Spring Odd-numbered Years
This course will provide an overview of statistical methods that have been specifically developed to aid our understanding and interpretation of the structure, abundance, and distribution of species and communities in relation to resources and the environment.
Prerequisites: STAT F200X, STAT F401 or equivalent; FISH F627 (Statistical Computing with R) or familiarity with R, general ecology, graduate standing in fisheries or permission of instructor.
Cross-listed with MSL F631.
Lecture + Lab + Other: 1 + 3 + 0

FISH F631  Data Analysis in Community Ecology
3 Credits
Offered Spring Odd-numbered Years
This course will provide an overview of statistical methods that have been specifically developed to aid our understanding and interpretation of the structure, abundance, and distribution of species and communities in relation to resources and the environment.
Prerequisites: STAT F200X, STAT F401 or equivalent; FISH F627 (Statistical Computing with R) or familiarity with R, general ecology, graduate standing in fisheries or permission of instructor.
Cross-listed with MSL F631.
Lecture + Lab + Other: 3 + 0 + 0

FISH F633  Pacific Salmon Life Histories
3 Credits
Offered Spring Even-numbered Years
This course provides an introduction to the life histories of Pacific salmon. We will explore variation in life history traits within and among species, as well as within and among populations, at each stage of the salmon life cycle. Life histories will be understood in evolutionary and ecological contexts. We will also discuss management and conservation of Pacific salmonid species throughout their range, but with focus on Alaska. This course is taught in Juneau. Stacked with FISH F433
Prerequisites: BIOL F115X, BIOL F116X or equivalent.
Lecture + Lab + Other: 3 + 0 + 0

FISH F640  Management of Renewable Marine Resources
3 Credits
Offered Spring Even-numbered Years
Principles of fisheries management, along with case studies of successes and failures. Topics include management objectives, relationships of fished species to their environment, fishing methods, human dimensions, fishery data acquisition, harvest strategies, ecosystem effects of fishing, aquaculture and alternative management strategies, including ecosystem-based fishery management.
Prerequisites: FISH F427.
Recommended: FISH F487.
Lecture + Lab + Other: 3 + 0 + 0

FISH F641  Ecosystem-based Fisheries Management
2 Credits
Offered Spring Odd-numbered Years
This course examines the theory and practice of ecosystem-based fisheries management (EBFM). Topics include legal frameworks, principles, governance, approaches, scientific basis, management implementation and outcomes of EBFM. Emphasis is placed on Alaska with other illustrative examples from around the world.
Prerequisites: FISH F487, or FISH F640; or graduate standing; or permission of the instructor.
Lecture + Lab + Other: 2 + 0 + 0

FISH F642  Bayesian Decision Theory for Resource Management
4 Credits
Offered Spring Even-numbered Years
Application of decision theory to problems in natural resources management. Students will learn to perform Bayesian calculations and uncomplicated decision analysis themselves.
Prerequisites: FISH F621 or STAT F642.
Lecture + Lab + Other: 2 + 2 + 0

FISH F645  Bioeconomic Modeling and Fisheries Management
3 Credits
Offered Spring Even-numbered Years
An introduction to analytic and computational models of discrete-time representations of bioeconomic systems, including comparative static and optimal control approaches to optimizing unitary and multiple criteria subject to deterministic and stochastic dynamic processes. Particular attention is given to bioeconomic models of optimal management of exploited populations of fish and shellfish.
Prerequisites: STAT F401; MATH F230X or MATH F251X; graduate standing; or permission of instructor.
Lecture + Lab + Other: 3 + 0 + 0

FISH F650  Fish Ecology
3 Credits
Offered Fall Odd-numbered Years
This course is an in-depth examination of how fish interact with, and adapt to, their physical and biological environment, taught through the viewpoint that habitat diversity acts as a template for biological diversity within and among species. We will examine the ecology of major and marine habitats (with an emphasis on the former), as well as the potential threats to these habitats from human activity.
Prerequisites: Graduate standing; or permission of instructor.
Stacked with FISH F425.
Lecture + Lab + Other: 3 + 0 + 0
FISH F651  Fishery Genetics
4 Credits
Offered Spring Odd-numbered Years
This course is taught in Juneau. Application of genetics to fisheries. Focus on Alaska fisheries including introduction to the theory of electrophoresis, stock separation, population genetics and quantitative genetics.
Lecture + Lab + Other: 4 + 0 + 0

FISH F653  Zooplankton Ecology
3 Credits
Offered Alternate Spring
This course is taught in Juneau. Survey of marine zooplankton including processes and variables which influence their production and dynamics. Emphasis on the northeast Pacific and Arctic Ocean zooplankton communities. Field and lab methods for sampling include fixing, preserving, subsampling, identifying and quantifying zooplankton collections. Laboratory techniques for culture of zooplankton include physiological measurements of bioenergetic parameters. Course is offered outside Fairbanks by video conference.
Prerequisites: MSL F650; or permission of instructor.
Cross-listed with MSL F653.
Lecture + Lab + Other: 3 + 0 + 0

FISH F654  Benthic Ecology
3 Credits
Offered Fall As Demand Warrants
Ecology of marine benthos, from subtidal to hadal zone. Methods of collecting, sorting, narcotizing, preserving and analyzing benthic assemblages, including video analytical techniques from submersibles and ROVs. Hydrothermal vent and cold seep assemblages. Physiology/energetics of benthic organisms, including animal-sediment relationships, feeding, reproduction and growth. Depth, spatial and latitudinal distribution patterns.
Prerequisites: Invertebrate zoology course, marine biology course, or permission of instructor.
Cross-listed with MSL F654.
Lecture + Lab + Other: 3 + 0 + 0

FISH F654J  Benthic Ecology
3 Credits
Offered Fall Even-numbered Years
Ecology of marine benthos, from subtidal to hadal zone. Methods of collecting, sorting, narcotizing, preserving and analyzing benthic assemblages, including video analytical techniques from submersibles and ROVs. Hydrothermal vent and cold seep assemblages. Physiology/energetics of benthic organisms, including animal-sediment relationships, feeding, reproduction and growth. Depth, spatial and latitudinal distribution patterns.
Prerequisites: Invertebrate zoology course; marine biology course; or permission of instructor.
Cross-listed with MSL F654.
Lecture + Lab + Other: 3 + 0 + 0

FISH F655  Seafood Processing and Preservation
3 Credits
Offered Spring
Positive and negative aspects of processing and preservation of seafoods are discussed. Practical aspects of preservation are stressed and topics include thermal processing (canning and pasteurization), fish smoking, salting, drying, pickling, freezing, fermentation, natural preservatives and packaging. Aspects of selected processing and preservation techniques to be demonstrated in the FITC pilot plant.
Prerequisites: BIOL F342; CHEM F451; or permission of instructor.
Recommended: MATH F230X or MATH F253X.
Lecture + Lab + Other: 3 + 0 + 0

FISH F656  Seafood Composition and Analysis
3 Credits
Offered Fall
Major components of foods, their properties, analysis and interactions during processing and preservation, the effect of processing on functional and nutritive value, postmortem microbial and biochemical changes especially proteins, lipids and carbohydrates. Role of minor constituents such as flavors, vitamins, toxins and carcinogens. This course is offered via videoconference.
Prerequisites: BIOL F342; CHEM F451; or permission of instructor.
Lecture + Lab + Other: 3 + 0 + 0

FISH F657  Aquatic Entomology
2 Credits
Offered Fall Odd-numbered Years
Aquatic invertebrate taxonomy, mostly to the family level, and ecology. Includes field trips to learn collecting techniques and habitats.
Prerequisites: Graduate standing or permission of instructor; Students must be able to safely wade in streams and wetlands.
Cross-listed with BIOL F665.
Lecture + Lab + Other: 1 + 3 + 0

FISH F658  Quantitative Analysis for Marine Policy Decisions
3 Credits
Offered Spring Even-numbered Years
An introduction to the practical application of mathematical programming, operations research, simulation, cost-benefit analysis, cost-effectiveness analysis, regional impact assessment, economic valuation, risk analysis, adaptive management and other decision theoretic tools in preparation of regulatory documents required for the management of living marine resources and for assessment of environmental damages.
Prerequisites: STAT F401; MATH F230X or MATH F251X; graduate standing; or permission of instructor.
Lecture + Lab + Other: 3 + 0 + 0

FISH F659  Law and Fisheries
2 Credits
Offered Fall Even-numbered Years
This course introduces students to the key Federal, State and International laws that govern fisheries in Alaska state waters and in the US Exclusive Economic Zone off Alaska. In addition, the course introduces students to seminal court rulings that have helped shape those laws.
Prerequisites: graduate standing or permission of instructor.
Lecture + Lab + Other: 2 + 0 + 0
FISH F675  Political Ecology  
3 Credits  
Offered Fall Even-numbered Years  
Introduction to the field of political ecology. Topics include the sociology of scientific knowledge, traditional and local ecological knowledge, politics of resource management, processes of enclosure and privatization, environmental values, conservation, environmental justice, and colonialism and economic development.  
**Prerequisites:** Graduate standing or permission of instructor.  
**Cross-listed with** ANTH F675.  
**Lecture + Lab + Other:** 3 + 0 + 0

FISH F676  Aquatic Food Web Ecology  
3 Credits  
Offered Fall Even-numbered Years  
This course will examine theoretical and applied aspects of aquatic food web ecology, from the ecological processes that give rise to patterns in aquatic communities to the incorporation of trophic interactions into ecosystem-based management. Lectures and discussion will focus on ecological theory and case studies. Lab exercises will introduce empirical and modeling approaches for studying food web interactions. Proficiency with Excel and basic statistics is preferred.  
**Prerequisites:** FISH F425 or permission of instructor.  
**Cross-listed with** MSL F676.  
**Lecture + Lab + Other:** 2 + 3 + 0

FISH F680  Marine Sustainability Internship  
2 Credits  
Offered Fall  
Internship program in marine ecosystem sustainability to broaden students' interdisciplinary training, develop new research tools, build expertise outside their home discipline, gain exposure to careers, and gain a unique perspective on research problems. Internships are for a minimum of 8 weeks and take place during the summer. In the autumn students report on and meet to discuss their internship experiences.  
**Prerequisites:** MSL F652 or permission of instructor.  
**Cross-listed with** ANTH F680 and MSL F680.  
**Lecture + Lab + Other:** 0 + 0 + 5-16

FISH F681  The North Pacific Fishery Management Council: A Case Study  
2 Credits  
Offered Summer  
This two-week intensive course provides immersion into the scientific and policy basis for fisheries management in Alaska. Students receive two days of classroom instruction, review current management issues and witness the decision-making process by attending a North Pacific Fishery Management Council Meeting. Learning is enhanced by discussions with diverse stakeholders and field trips.  
**Prerequisites:** Permission of instructor.  
**Lecture + Lab + Other:** 1 + 0 + 1

FISH F682  Field Course in Salmon Management  
4 Credits  
Offered Summer Odd-numbered Years  
A hands-on study of salmon management, with participation of harvesters, processors, managers and scientists. Students will track the return of salmon to Bristol Bay and estimate the total return as the runs develop. Consists of a combination of lectures, computer laboratories and field experience in data collection.  
**Prerequisites:** Permission of instructor.  
**Lecture + Lab + Other:** 3 + 3 + 0

FISH F687  Fisheries Management  
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3 Credits  
Offered Spring  
Theory and practice of fisheries management, with an emphasis on strategies utilized for the management of freshwater and marine fisheries. Application of quantitative methodologies for the assessment and manipulation of aquatic habitats, sport and commercial fish populations, and stock assessment are considered, as is the setting of appropriate goals and objectives for effective, science-based management.  
**Prerequisites:** graduate standing.  
**Recommended:** completion of at least an elementary statistics course.  
**Stacked with** FISH F487.  
**Lecture + Lab + Other:** 3 + 0 + 0

FISH F692  Seminar  
0.5-6 Credits  
**Lecture + Lab + Other:** 0 + 0 + 0

FISH F692A  Seminar  
1-6 Credits  
**Lecture + Lab + Other:** 0 + 0 + 0

FISH F692P  Seminar  
1-6 Credits  
**Lecture + Lab + Other:** 1-6 + 0 + 0

FISH F698  Non-Thesis Research/Project  
1-9 Credits  
**Lecture + Lab + Other:** 0 + 0 + 0

FISH F699  Thesis  
1-12 Credits  
**Lecture + Lab + Other:** 0 + 0 + 0