BIOLOGY (BIOL)

BIOL S101 Introduction to Biological Research Techniques I
1-3 credits: 1 (.5+1)
A research-based lab class focusing on the use of techniques and research tools to answer locally relevant ecological, taxonomic or management questions. Consists of lectures, lab and/or field work, reviewing scientific literature, and research writing. Students work alone or in pairs on research questions approved by the instructor to develop and implement a research plan for their project and write a synopsis of their research. Lab and field techniques appropriate to the plan will be taught. Note: Not accepted for Biology major or Biology elective credit.

BIOL S102 Introduction to Biological Research Techniques II
1-3 credits: 1 (.5+1)
Students will complete the work outlined in the study plan developed in BIOL S101. Students will learn appropriate basic data analysis tools such as phylogenetic programs and simple statistical methods. Critical thinking skills will be emphasized as students explore and analyze their data. Students will write up their research findings formatted as a scientific manuscript and will prepare a public research presentation. Note: Not accepted for Biology major or Biology elective credit.
Prerequisite: BIOL S101 (C- or better).

BIOL S103 *Biology and Society
4 credits (3+3)
GER. Fundamental principles of biology focusing on human biology, ecology and the environment. Laboratory sessions include field trips, experiments, demonstrations, and discussion of contemporary biological topics. For non-majors; cannot be used to fulfill requirement for biology majors.
Prerequisite: MATH S105 or concurrent enrollment.

BIOL S104 *Natural History of Alaska
4 credits (3+3)
GER. The physical environment peculiar to the North and important in determining the biological setting: major ecosystem concepts to develop an appreciation for land use and wildlife management problems in both terrestrial and aquatic situations. May not be used as biology elective credit for a major in Biology. BIOL S104 fulfills a Natural Science General Education Requirement.

BIOL S107 Flora of Southeastern Alaska
1 credit (1+0)
Students will learn to recognize the native trees, shrubs and herbs found in Southeastern and coastal South Central Alaska. Focus will be on identification of common plant species and attaining an understanding of plant ecological requirements, interaction with other organisms, and human use of plants. Note: Not accepted for biology major credit or elective.

BIOL S108 Experiential Learning: Ecology of Southeast Alaska
2 credits (1+2)
Students will improve their science communication skills, learning skills, and their knowledge of the ecosystems of Southeast Alaska while interacting with faculty and exploring research techniques. Note: Not accepted for Biology major or Biology elective credit. Pass/Fail grading
Prerequisite: BIOL S115 (formerly BIOL S105) or concurrent enrollment, or instructor approval.

BIOL S110 Introduction to Marine Fisheries Science
3 credits (3+0)
Explores the patterns of fishery species diversity, and the resilience and sustainability that result. Introduces the complexity of what constitutes a fishery and factors that have led some fisheries to collapse and others to persist. Students will gain a better understanding of the science of sustainability in Alaska, with a focus on 21st-century global fishery challenges, such as climate change.

BIOL S111 *Human Anatomy and Physiology I
4 credits (3+3)
GER. Integrated view of human structure and function. Provides a foundation in relevant chemistry, cell biology, histology and unifying concepts. Covers integumentary, skeletal, muscular, and nervous systems.

BIOL S112 *Human Anatomy and Physiology II
4 credits (3+3)
GER. Integrated view of human structure and function. Continuation of Human AP I. Covers endocrine, cardiovascular, lymphatic, immune, respiratory, digestive, urinary, and reproductive systems.
Prerequisite: BIOL S111 (C- or better) or permission.

BIOL S115 *Fundamentals of Biology I
4 credits (3+3)
GER. The first of a two-part course series for science majors. Covers the chemistry of life, cell structure and function, cellular energetics, cell division, genetics, and evolution.
Prerequisite: MATH S105 or concurrent enrollment.

BIOL S116 *Fundamentals of Biology II
4 credits (3+3)
GER. The second of a two-part course series for science majors. Covers speciation, organismal diversity, form and function of plants and animals, and ecology.
Prerequisite: BIOL S115 (formerly BIOL S105) and MATH S151 or concurrent enrollment.

BIOL S120 One Health Perspectives: Marine Mammals of Alaska
1 credit (1+0)
Introduces marine mammals of Alaska and the interdependence of human, animal, and environmental health. Topics include an overview of Alaska's marine mammals, anatomical and physiological adaptions to the marine environment, agents of disease and other health risks for marine mammals, Indigenous perspectives, and linkages between marine mammal and human health. Culminates in demonstrations of necropsy techniques on marine mammals (such as seal and whale) for assessing wildlife health. Not accepted for Biology major or Biology elective credit.

BIOL S175 Current Topics in Marine Research
1 credit (1+0)
A fall symposium of lectures presented as part of the Sitka WhaleFest: A Celebration of Marine Wildlife. Marine scientists will present current research findings on topics focused on marine life around the Pacific Rim, with an emphasis on marine mammals. Students must attend an introductory class, all symposium lectures, and a follow up group discussion with invited researchers; written summaries of the lectures will be required. Students must be registered for the Sitka WhaleFest.May be repeated for credit when content differs.

BIOL S194 Practicum:
1-3 credits (0+0+ 4-12)
Supervised practical application of a previously studied theory conducted under the supervision of a qualified professional in cooperation with a faculty member. Requires 50 hours per credit of supervised practicum work, and signed approval by the faculty instructor (and also the chair or dean, if an individual practicum).

BIOL S215 Introduction to Marine Biology
3 credits (3+0)
An introduction to the major characteristics of ocean ecosystems and the organisms that inhabit them. Includes physical, chemical, and biological principles that affect marine biodiversity.
Prerequisite: BIOL S115 and BIOL S116.

BIOL S239 Introduction to Plant Biology
4 credits (3+3)
Structure, function, ecology, and evolutionary patterns of the major groups of plants.
Prerequisite: BIOL S115 and BIOL S116.

BIOL S240 Introductory Microbiology
4 credits (3+3)
General introductory microbiology with emphasis on microorganisms as disease causing agents. Fundamentals of microbial biology and diversity including host microbe interactions and epidemiology. Not accepted for Biology major credit. Recommended for health science students. BIOL S112 and CHEM S104 recommended.
Prerequisite: 8 credits in biology or chemistry.

BIOL S271 Ecology
4 credits (3+3)
Overview of the principles of ecology with emphasis on the organism, population, community, ecosystem and biome levels. Aspects of the physical environment are included in the organismal ecology discussions. Laboratory sessions mainly are field exercises in biological sampling and analyses.
Prerequisite: BIOL S115; and either BIOL S116 or ENVS S102; and STAT S200 or concurrent enrollment.

BIOL S294 Practicum:
1-2 credits (0+0+4)
Practical application of a previously studied theory, conducted under the supervision of a qualified professional in cooperation with a faculty member from the department. Requires approval form. Practica require a minimum of 50 clock hours per credit.

BIOL S298 Individual Research

BIOL S310 Animal Physiology
4 credits (3+3)
Chemical and physical principles underlying living processes, and the integration of these principles into the physiology of cells and whole organisms. Three hours lab per week required.
Prerequisite: BIOL S115 and S116, CHEM S105 and S106, and MATH S151.

BIOL S311 Communicating Science
3 credits (3+0)
Introduction to writing and speaking in a variety of scientific and technical forms. This includes writing reports, journal articles, grant proposals, and speaking at scientific meetings and seminars, community events, and to the popular press. Practice in writing for different audiences, editing, using online bibliographic programs, and presenting completed works to an audience of peers.
Prerequisite: WRTG S211 and upper division standing in a science degree program.

BIOL S349 Biological Oceanography
3 credits (3+0)
Provides foundational knowledge about the biology of our world's oceans, including events of ancient oceans that are central to the rise of our modern oceans. Students will learn about today's ocean, the diversity of ecosystems from the shoreline to the deep, and the physical, chemical, and geological drivers of ecosystem patterns. Students will also learn about how the ocean is changing, climate disruption processes, and about some of the most promising solutions to these challenges.
Prerequisite: Upper-division standing in the natural sciences department or instructor approval.

BIOL S353 Tropical Marine and Coastal Ecology
3 credits (2+2)
Focuses on the ecology of coral reefs, seagrass beds, and mangrove forests; endangered and invasive species; conservation biology; climate change; and marine policy and management. Field activities include observation of flora and fauna by snorkeling in marine habitats, tide pool exploration, coastal hikes, and examination of marine reserves. Travel to tropical sites is a required course component. Recommended: BIOL S215 and BIOL S271.
Prerequisite: BIOL S116.

BIOL S355 Experimental Design and Data Analysis
4 credits (3+3)
Design and analysis of manipulative and observational research projects, with an emphasis on practical aspects of experimental design and collection of samples in field environments. Includes lectures, field and lab exercises exploring the nature of data, common design challenges, application of standard univariate statistics, analysis of variance, regression and analysis of covariance, and analysis of categorical data. Also explored are issues in scientific ethics, research animal welfare, scientific writing, and data presentation.
Prerequisite: STAT S200 and upper division standing.

BIOL S362 Genetics
4 credits (3+2)
Principles of inheritance; physiochemical properties of genetic systems.
Prerequisite: BIOL S115 and BIOL S116; CHEM S106; and MATH S151.

BIOL S373 Conservation Biology
4 credits (3+3)
An exploration of how biological principles are applied to conserve diversity at all levels of biological organization, from genes to biomes.
Prerequisite: BIOL S271.

BIOL S375 Current Topics in Biology:
2 credits (2+0)
Discussion of a book or series of papers on a current topic in biology. Students will lead discussions and be graded on both their presentation and their participation in discussions. May be repeated for credit.
Prerequisite: BIOL S115 and BIOL S116.

BIOL S380 Marine Ornithology and Herpetology
3 credits (3+0)
A survey of the basic biology of marine birds and marine reptiles. Topics include taxonomy, phylogeny, evolution, anatomy, physiology, reproduction, foraging strategies, habitat use, navigation, migration, and conservation. Lectures will be supplemented with in-class discussions of required readings and one field trip to observe local bird species. Recommended but not required: BIOL S215 and BIOL S271.
Prerequisite: BIOL S105 and BIOL S106.

BIOL S384 Marine Mammalogy
4 credits (3+3)
The evolution and classification of marine mammals will be presented as a framework for understanding their adaptations, physiology, anatomy, behavior, ecology, reproduction, and mating systems. Current research techniques and conservation issues will also be reviewed. Students will write and present a paper on a special topic. Two field trips (dates TBA). BIOL S215 recommended.
Prerequisite: BIOL S115 and BIOL S116, and BIOL S271.

BIOL S396 Field Studies in Behavior and Ecology
1-6 credits (variable (0+0+ 4-24)
Intensive field study in selected topics in animal behavior and ecology with emphasis on field methods. Each student will conduct an individual research project. Field studies may entail a deferred grade. Projects may be associated with on-going research projects or new projects developed by the instructor and student. Number of credits will be determined by the scope of the project. May be repeated for up to 12 credits.Letter grades or Pass/Fail may be arranged by permission of instructor.
Prerequisite: BIOL S105, BIOL S106, BIOL S271 and signed permission form.

BIOL S405 Invertebrate Zoology
4 credits (3+3)
Structure, function, classification, evolution and life histories of invertebrate animals. Marine invertebrates are emphasized. (Formerly offered as BIOL S305).
Prerequisite: BIOL S115 and BIOL S116 (formerly BIOL S105 and S106).

BIOL S410 Physiology of Marine Animals
3 credits (3+0)
An integration of physiological concepts with ecology and evolution to examine how organisms adapt within a diversity of marine environments including the intertidal, subtidal, and the deep sea. Emphasizes the biochemical adaptations within the processes of respiration, osmoregulation, thermoregulation, and metabolism of marine invertebrates, fishes, and marine mammals.
Prerequisite: BIOL S310.

BIOL S427 Introduction to Ichthyology
4 credits (3+3)
Major groups of fishes, emphasizing the fishes of northwestern North America. Classification, structure, evolution, general biology and importance to man of the major groups.
Prerequisites: BIOL S115 and BIOL S116.

BIOL S441 Animal Behavior
4 credits (3+3)
The mechanisms and adaptive nature of individual and social behaviors will be explored in lectures, reading, and laboratory and field exercises. Proximal and ultimate explanations for behavior are studied in terms of genetics, ecology, and modern evolutionary theory. Laboratory and field exercises emphasize hypothesis testing through observations and analysis of behavior. BIOL S362 (Genetics) is highly recommended before taking this course.
Prerequisites: BIOL S115, BIOL S116, or BIOL S271, or instructor permission.

BIOL S480 Aquatic Pollution
3 credits (3+0)
Discusses all major kinds of marine pollution including oil, heavy metals, organic wastes, pulp mill effluent, PCBs, pesticides, ocean dumping, radioactive wastes, thermal pollution, marine litter and noise pollution. Effects on biological systems are emphasized. Some consideration given to legal aspects.
Prerequisite: BIOL S271 and CHEM S106.

BIOL S481 Marine Ecology
4 credits (3+3)
In-depth study of the paradigms regarding the distribution and abundance of marine organisms including analysis and discussion of current primary literature. Major emphasis on how physical-biological interactions structure populations, communities, and ecosystems in the oceans. Students will complete a research project.
Prerequisite: BIOL S215, BIOL S271, and STAT S200.

BIOL S482 Evolution
4 Credits (3+3)
Entails in-depth study of the mechanisms of evolution. The roles of genetic variation, natural selection, and adaptation in speciation and other evolutionary processes will be examined in an historical context. Competing schools of thought from the era of "The Origin of the Species" to recent advances in molecular evolution will be considered.
Prerequisite: BIOL S115 and BIOL S116; and BIOL S362 or concurrent enrollment.

BIOL S491 Internship

BIOL S492 Biology Seminar
1 credit (1+0)
Provides students with first-hand accounts of current research in the biological sciences. Seminar speakers will present research results in a variety of subdisciplines, and students will discuss the significance with presenters and instructor. May be repeated for credit.
Prerequisite: BIOL S116.

BIOL S494 Biology Practicum

BIOL S498 Research in Biology
1-6 credits (variable)
Individual research in the biological sciences undertaken by a student in consultation with a member of the biology program faculty. Students may submit research ideas to faculty and develop them into a project with faculty input.
Prerequisite: BIOL S115, BIOL S116, and BIOL S271, and signed permission form.