

INTEGRATIVE BIOLOGY

The Department of Integrative Biology (IB) is part of the School of Life Sciences and receives support for its academic program from the College of Science. In addition to the faculty's activities in research and service, it has teaching responsibilities in the graduate Integrative Biology major, as well as the undergraduate Biology and Zoology majors and Biology minor. Biology and Zoology courses are also part of the education of most undergraduate majors at Oregon State University (OSU).

Undergraduate Degrees

IB offers undergraduate BS degrees in Biology and Zoology. The Biology major is offered at the Corvallis and Cascades campuses. The major was created for students who wish to obtain broad, interdisciplinary training in the biological sciences. Biology is a common destination for students interested in health professions and provides excellent training for graduate programs in the life sciences. It also offers undergraduate options in Ecology, Genetics, Marine Biology, Pre-Dentistry, Pre-Education, Pre-Medicine, and Pre-Veterinary Medicine. The Zoology major is offered at the Corvallis campus and via Ecampus. This major includes diverse electives for students interested in the diversity, organismal biology, ecology, and evolution of animals. Zoology prepares students for a wide range of careers from animal care to research. Both majors benefit from the wealth of departmental course offerings and faculty field and laboratory research. Students majoring in Biology or Zoology cannot seek a dual major or double degree in both majors.

Graduate Degrees

IB is a vertically integrated department with an internationally recognized graduate program. Faculty work at the level of the cell, organism, and community and have expertise in areas of behavioral ecology, marine biology and ecology, disease ecology, evolutionary biology, conservation biology, environmental physiology, population genetics, genomics, chemical ecology, cell and developmental biology, symbiosis and paleobiology. Detailed information on the graduate faculty and program is available from the Department of Integrative Biology website. IB offers MS and PhD degrees.

Undergraduate Programs

Majors

- Biology (<http://catalog.oregonstate.edu/college-departments/science/school-life-sciences/integrative-biology/biology-bs-hbs/>)
 - Options:**
 - *Ecology*
 - *Genetics*
 - *Marine Biology*
 - *Physiology and Biology*
 - *Pre-Dentistry/Biology*
 - *Pre-Education*
 - *Pre-Medicine/Biology*
 - *Pre-Veterinary Medicine*
- Zoology (<http://catalog.oregonstate.edu/college-departments/science/school-life-sciences/integrative-biology/zoology-bs-hbs/>)

Minors

- Biology (<http://catalog.oregonstate.edu/college-departments/science/school-life-sciences/integrative-biology/biology-minor/>)

- Marine Biology and Ecology (<http://catalog.oregonstate.edu/college-departments/science/school-life-sciences/integrative-biology/marine-biology-ecology-minor/>)

Graduate Programs

Major

- Integrative Biology (<http://catalog.oregonstate.edu/college-departments/science/school-life-sciences/integrative-biology/integrative-biology-ms-phd/>)

Minor

- Integrative Biology (<http://catalog.oregonstate.edu/college-departments/science/school-life-sciences/integrative-biology/integrative-biology-graduate-minor/>)

Virginia M. Weis, *Head*

Robert T. Mason, *Associate Head*

3029 Cordley Hall
Oregon State University
Corvallis, OR 97331-2914
Phone: 541-737-2993
Email: ib@oregonstate.edu (ib@science.oregonstate.edu)
Website: <http://ib.oregonstate.edu>

Faculty

Professors Blaustein, Blouin, De Leenheer, Denver, Hacker, Lubchenco, Lytle, Maddison, Mason, Menge, Sponaugle, Warrick, Weis

Associate Professors Henkel, Jolles, Novak, Terry

Associate Professor, Senior Research Chan

Assistant Professors Barreto, Burke, Cornelius, Dalziel

Assistant Professors, Senior Research Grorud-Colvert

Senior Instructors II Blair, Lavery

Senior Instructors I Biga, Bouwma, Cheung, Kayes, Quick

Instructors Chouinard, Harjoe, Kirk, Landys, Rose

Professional Faculty Duncan, Leong-Kee, Marshall, McLeod, Meyer, Palmer

Adjunct Faculty Warren

Biology (BI)

BI LD1, GENERAL CREDIT, 1-16 Credits

BI LD2, GENERAL CREDIT, 1-16 Credits

BI 003, UNDERGRADUATE RESEARCH, 0 Credits

Engage in research activities appropriate to the discipline; and through the research experience, acquire skills, techniques, and knowledge relevant to the field of study. In consultation with a faculty mentor, engage in research activity, and make and execute a plan for a project.

BI 101, *ENVIRONMENTAL BIOLOGY: ECOLOGY, CONSERVATION, GLOBAL CHANGE, 4 Credits

Introduction to ecosystems, including biodiversity, species interactions, human impacts, and conservation biology. Lectures introduce biological themes and research in the context of current issues in science and society. Hands-on laboratories focus on using organisms and technologies to explore biology and develop skills for lifelong learning. No previous science courses are required, intended for non-biological science majors. This course can be taken alone or in any combination with BI 102 or 103. Lec/lab/rec. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science

Available via Ecampus

BI 102, *ANIMAL BIOLOGY: GENES, BEHAVIOR AND EVOLUTION OF LIFE, 4 Credits

Introduction to how genetics shapes life on Earth, including how understandings of DNA and environmental factors are leading to biotechnological advances. Lectures introduce biological themes and research in the context of current issues in science and society. Hands-on laboratories focus on using organisms and technologies to explore biology and develop skills for lifelong learning. No previous science courses are required, intended for non-biological science majors. This course can be taken alone or in any combination with BI 101 and BI 103. Lec/lab/rec. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science

Equivalent to: BI 102H

Available via Ecampus

BI 103, *HUMAN BIOLOGY: ANATOMY, PHYSIOLOGY AND DISEASE, 4 Credits

Introduction to the biology of humans, including aspects of human health and disease. Lectures introduce biological themes and research in the context of current issues in science and society. Hands-on laboratories focus on using organisms and technologies to explore biology and develop skills for lifelong learning. No previous science courses are required, intended for non-biological science majors. This course can be taken alone or in any combination with BI 101 and BI 102. Lec/lab/rec. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science

Equivalent to: BI 103H

BI 109, HEALTH PROFESSIONS: MEDICAL, 1 Credit

Discussion of matters relating to a medical career. Includes application procedures, the importance of various requirements, admissions, professional school curricula, financing education, and related matters. Speakers are included. Graded P/N.

BI 111, INTRODUCTION TO MARINE LIFE IN THE SEA: MARINE HABITATS, 1 Credit

A field-focused learning experience exploring the varied marine life and habitats on the Oregon coast, including rocky shores, sandy beaches, mud flats, bays and estuaries. Students will also be introduced to the breadth of marine science course offerings and research at Oregon State University's Hatfield Marine Science Center located in Newport, Oregon. Graded P/N.

Equivalent to: FW 111

BI 150, INTRODUCTION TO MARINE BIOLOGY, 3 Credits

Survey of marine organisms, the environments they inhabit, and their evolutionary adaptations for thriving in those environments. The course will also highlight current conservation challenges that threaten marine life, such as climate change, overfishing, and pollution.

BI 175, *GENOMES, IDENTITIES AND SOCIETIES, 3 Credits

DNA's roles in shaping our senses of identity, individuality, and societal interconnectivity will be analyzed. New advances in genetic technology will be explored, along with their potential impacts on society. The relationships between genetics and discrimination will be examined with focus on cases from Oregon, America, and the world. (Bacc Core Course)

Attributes: CPDP – Core, Perspective, Difference/Power/Discrimination

BI 197, PROFESSIONAL DEVELOPMENT I: HEALTH PROFESSIONS, 1 Credit

Integrative Biology faculty and other professionals introduce a variety of human health professions including dentistry, medicine, pharmacy and others (veterinary medicine students take BI 198). Emphasizes professional development through exploring relevant social and cognitive concepts, as well as engaging in experiential learning and networking. Departmental and campus student success resources are highlighted. Graded P/N.

BI 198, PROFESSIONAL DEVELOPMENT I: BIOLOGY AND ZOOLOGY, 1 Credit

Integrative Biology faculty and biology professionals introduce life science careers outside of human health professions (human health profession students take BI 197). Emphasizes professional development through exploring relevant social and cognitive concepts, as well as engaging in experiential learning and networking. Departmental and campus student success resources are highlighted. Graded P/N.

Available via Ecampus

BI 199, SELECTED TOPICS, 1-16 Credits

Field Ecology.

Equivalent to: BI 199H

This course is repeatable for 16 credits.

BI 199H, SELECTED TOPICS, 1-16 Credits

Attributes: HNRS – Honors Course Designator

Equivalent to: BI 199

This course is repeatable for 16 credits.

BI 204, *INTRODUCTORY BIOLOGY I, 4 Credits

Foundations of biological sciences including scientific inquiry, genetics, evolution, and ecology. Significant emphasis throughout on the application of core concepts to solve human and environmental problems. Laboratory emphasizes skills in critical thinking, scientific writing, and experimental design. Not intended for pre-health profession students. Lec/lab. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science

Available via Ecampus

BI 205, *INTRODUCTORY BIOLOGY II, 4 Credits

Fundamental concepts in molecular and cellular biology, beginning with biomolecules and the origin of life, and ending with genomics. Significant emphasis throughout on applications of biotechnology to solve human problems. Laboratory emphasizes skills in critical thinking, scientific writing, and experimental design. Not intended for pre-health profession students. Lec/lab. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science

Prerequisite: CH 121 (may be taken concurrently) with D- or better or CH 201 (may be taken concurrently) with D- or better or ((CH 231 (may be taken concurrently) with D- or better or CH 231H (may be taken concurrently) with D- or better) and (CH 261 (may be taken concurrently) [D-] or CH 261H (may be taken concurrently) [D-] or CH 271 (may be taken concurrently) [D-] or CH 271H (may be taken concurrently) [D-]))

Available via Ecampus

BI 206, *INTRODUCTORY BIOLOGY III, 4 Credits

Basic plant and animal physiology from an evolutionary perspective. Significant emphasis on topics of importance to human society, including human and plant disease. Laboratory emphasizes skills in critical thinking, scientific writing, and experimental design. Not intended for pre-health professional students. Lec/lab. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science

Prerequisite: CH 121 (may be taken concurrently) with D- or better or CH 201 (may be taken concurrently) with D- or better or ((CH 231 (may be taken concurrently) with D- or better or CH 231H (may be taken concurrently) with D- or better) and (CH 261 (may be taken concurrently) [D-] or CH 261H (may be taken concurrently) [D-] or CH 271 (may be taken concurrently) [D-] or CH 271H (may be taken concurrently) [D-]))

Available via Ecampus

BI 211, *PRINCIPLES OF BIOLOGY, 4 Credits

Origins of life, energy transformations, plant and animal diversity. Lec/lab. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science

Equivalent to: BI 211H

BI 211H, *PRINCIPLES OF BIOLOGY, 4 Credits

Origins of life, energy transformations, plant and animal physiology. Lec/lab. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science; HNRS – Honors Course Designator

Equivalent to: BI 211

BI 212, *PRINCIPLES OF BIOLOGY, 4 Credits

Cell biology, organ systems, plant and animal physiology. Lec/lab. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science

Prerequisite: CH 121 (may be taken concurrently) with D- or better or CH 201 (may be taken concurrently) with D- or better or CH 221 (may be taken concurrently) with D- or better or CH 224H (may be taken concurrently) with D- or better or ((CH 231 (may be taken concurrently) with D- or better or CH 231H (may be taken concurrently) with D- or better) and (CH 261 (may be taken concurrently) [D-] or CH 261H (may be taken concurrently) [D-] or CH 271 (may be taken concurrently) [D-]))

Equivalent to: BI 212H

BI 212H, *PRINCIPLES OF BIOLOGY, 4 Credits

Cell biology, organ systems, plant and animal physiology. Lec/lab. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science; HNRS – Honors Course Designator

Prerequisite: CH 121 (may be taken concurrently) with D- or better or CH 201 (may be taken concurrently) with D- or better or CH 221 (may be taken concurrently) with D- or better or CH 224H (may be taken concurrently) with D- or better or ((CH 231 (may be taken concurrently) with D- or better or CH 231H (may be taken concurrently) with D- or better) and (CH 261 (may be taken concurrently) [D-] or CH 261H (may be taken concurrently) [D-] or CH 271 (may be taken concurrently) [D-]))

Equivalent to: BI 212

BI 213, *PRINCIPLES OF BIOLOGY, 4 Credits

Genetics, evolution, natural selection, and ecology. Lec/lab. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science

Prerequisite: CH 121 with D- or better or CH 201 with D- or better or CH 221 with D- or better or CH 224H with D- or better or ((CH 231 with D- or better or CH 231H with D- or better) and (CH 261 [D-] or CH 261H [D-] or CH 271 [D-]))

Equivalent to: BI 213H

BI 213H, *PRINCIPLES OF BIOLOGY, 4 Credits

Genetics, evolution, natural selection, and ecology. Lec/lab. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science; HNRS – Honors Course Designator

Prerequisite: CH 121 with D- or better or CH 201 with D- or better or CH 221 with D- or better or CH 224H with D- or better or ((CH 231 with D- or better or CH 231H with D- or better) and (CH 261 [D-] or CH 261H [D-] or CH 271 [D-]))

Equivalent to: BI 213

BI 221, *PRINCIPLES OF BIOLOGY: CELLS, 4 Credits

Introduction to fundamental biological concepts and theories about the chemical and molecular basis of life, structure and function, transformation of energy and matter and information flow at a cellular and molecular level. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science

Prerequisite: (CH 121 (may be taken concurrently) with D- or better or CH 201 (may be taken concurrently) with D- or better) or ((CH 231 (may be taken concurrently) with D- or better or CH 231H (may be taken concurrently) with D- or better) and (CH 261 (may be taken concurrently) [D-] or CH 261H (may be taken concurrently) [D-] or CH 271 (may be taken concurrently) [D-]))

Equivalent to: BI 221H

BI 221H, *PRINCIPLES OF BIOLOGY: CELLS, 4 Credits

Introduction to fundamental biological concepts and theories about the chemical and molecular basis of life, structure and function, transformation of energy and matter and information flow at a cellular and molecular level. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science; HNRS – Honors Course Designator

Prerequisite: (CH 121 (may be taken concurrently) with D- or better or CH 201 (may be taken concurrently) with D- or better) or ((CH 231 (may be taken concurrently) with D- or better or CH 231H (may be taken concurrently) with D- or better) and (CH 261 (may be taken concurrently) [D-] or CH 261H (may be taken concurrently) [D-] or CH 271 (may be taken concurrently) [D-]))

Equivalent to: BI 221

BI 222, *PRINCIPLES OF BIOLOGY: ORGANISMS, 4 Credits

Introduction to fundamental biological concepts and theories about plant, and animal physiology, evolution, structure and function, transformation of energy and matter and systems at an organismal level. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science

Prerequisite: (BI 221 with C- or better or BI 221H with C- or better) and ((CH 121 (may be taken concurrently) with D- or better or CH 201 (may be taken concurrently) with D- or better) or ((CH 231 (may be taken concurrently) with D- or better or CH 231H (may be taken concurrently) with D- or better) and (CH 261 (may be taken concurrently) [D-] or CH 261H (may be taken concurrently) [D-] or CH 271 (may be taken concurrently) [D-]))

Equivalent to: BI 222H

BI 222H, *PRINCIPLES OF BIOLOGY: ORGANISMS, 4 Credits

Introduction to fundamental biological concepts and theories about plant, and animal physiology, evolution, structure and function, transformation of energy and matter and systems at an organismal level. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science; HNRS – Honors Course Designator

Prerequisite: (BI 221 with C- or better or BI 221H with C- or better) and ((CH 121 (may be taken concurrently) with D- or better or CH 201 (may be taken concurrently) with D- or better) or ((CH 231 (may be taken concurrently) with D- or better or CH 231H (may be taken concurrently) with D- or better) and (CH 261 (may be taken concurrently) [D-] or CH 261H (may be taken concurrently) [D-] or CH 271 (may be taken concurrently) [D-]))

Equivalent to: BI 222

BI 223, *PRINCIPLES OF BIOLOGY: POPULATIONS, 4 Credits

Introduction to fundamental biological concepts and theories about diversity, evolution, and ecology; specifically, evolutionary relationship, transformation of energy and matter, information flow and systems at a population level or above. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science

Prerequisite: (BI 221 with C- or better or BI 221H with C- or better) and ((CH 121 (may be taken concurrently) with D- or better or CH 201 (may be taken concurrently) with D- or better) or ((CH 231 (may be taken concurrently) with D- or better or CH 231H (may be taken concurrently) with D- or better) and (CH 261 (may be taken concurrently) [D-] or CH 261H (may be taken concurrently) [D-] or CH 271 (may be taken concurrently) [D-]))

Equivalent to: BI 223H

BI 223H, *PRINCIPLES OF BIOLOGY: POPULATIONS, 4 Credits

Introduction to fundamental biological concepts and theories about diversity, evolution, and ecology; specifically, evolutionary relationship, transformation of energy and matter, information flow and systems at a population level or above. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science; HNRS – Honors Course Designator

Prerequisite: (BI 221 with C- or better or BI 221H with C- or better) and ((CH 121 (may be taken concurrently) with D- or better or CH 201 (may be taken concurrently) with D- or better) or ((CH 231 (may be taken concurrently) with D- or better or CH 231H (may be taken concurrently) with D- or better) and (CH 261 (may be taken concurrently) [D-] or CH 261H (may be taken concurrently) [D-] or CH 271 (may be taken concurrently) [D-]))

Equivalent to: BI 223

BI 231, INTRODUCTION TO HUMAN ANATOMY AND PHYSIOLOGY, 3 Credits

The first of a three-term introductory series. Using a strong gross anatomy focus, course topics address fundamental concepts of biology as they apply to human anatomy and physiology and then focus on understanding the structures, functions, and regulatory mechanisms involved in the human skeleton, muscular and integumentary systems. BI 231 is a required prerequisite to BI 232 and BI 233. The BI 241 Lab is optional but prerequisite for either of the subsequent BI 242 or BI 243 lab courses in the series. Lec.

BI 232, INTRODUCTION TO HUMAN ANATOMY AND PHYSIOLOGY, 3 Credits

The second of a three-term introductory series. Using a strong gross anatomy focus, course topics address the structures, functions and regulatory mechanisms involved in the human nervous, endocrine and reproductive systems. Lec.

Prerequisite: BI 231 (may be taken concurrently) with C- or better

BI 233, INTRODUCTION TO HUMAN ANATOMY AND PHYSIOLOGY, 3 Credits

The third of a three-term introductory series. Using a strong gross anatomy focus, course topics address the structures, functions, and regulatory mechanisms involved in the human cardiovascular, respiratory, urinary and digestive systems. Lec.

Prerequisite: BI 231 (may be taken concurrently) with C- or better

BI 241, INTRODUCTION TO HUMAN ANATOMY AND PHYSIOLOGY LABORATORY, 2 Credits

The first of a three-term introductory series. Using the human cadaver (prosection), course topics address fundamental concepts of biology as they apply to human anatomy and physiology and then focus on understanding the structures, functions, and regulatory mechanisms involved in the human skeletal, muscular and integumentary systems. Physiology demonstrations illustrate functions of organ systems. Lab/rec.

Prerequisite: BI 231 (may be taken concurrently) with C- or better

BI 242, INTRODUCTION TO HUMAN ANATOMY AND PHYSIOLOGY LABORATORY, 2 Credits

The second of a three-term introductory series. Using the human cadaver (prosection) and dissection of preserved specimens with a strong gross anatomy focus, course topics address the structures, functions and regulatory mechanisms involved in the nervous, endocrine and reproductive systems. Physiology demonstrations illustrate functions of organ systems. Lab/rec.

Prerequisite: BI 231 (may be taken concurrently) with C- or better and BI 232 (may be taken concurrently) [C-] and BI 241 (may be taken concurrently) [C-]

BI 243, INTRODUCTION TO HUMAN ANATOMY AND PHYSIOLOGY LABORATORY, 2 Credits

The third of a three-term introductory series. Using the human cadaver (prosection) and dissection of preserved specimens with a strong gross anatomy focus, course topics address the structures, functions, and regulatory mechanisms involved in the human cardiovascular, respiratory, urinary and digestive systems. Physiology demonstrations illustrate functions of organ systems. Lab/rec.

Prerequisite: BI 231 (may be taken concurrently) with C- or better and BI 233 (may be taken concurrently) [C-] and BI 241 (may be taken concurrently) [C-]

BI 298, PROFESSIONAL DEVELOPMENT FOR BIOLOGISTS II, 1 Credit

Students will develop awareness of the elements of professional development, identify strategic areas for growth, and design an exploration plan. Emphasis is placed on being able to analyze career opportunities to determine the best mix of technical and professional skills needed for success as a biological science professional. Graded P/N.

Equivalent to: BI 298H

Available via Ecampus

BI 299, SPECIAL TOPICS, 1-16 Credits

This course is repeatable for 16 credits.

BI 301, *HUMAN IMPACTS ON ECOSYSTEMS, 3 Credits

Selected human impacts on ecosystems are examined in depth, including air quality, global climate change, management of agricultural and forest resources, and threats to biological diversity. The causes, approaches to investigating, and potential solutions for each issue are discussed from a scientific and social perspective. Adverse effects on ecosystems that result from each environmental problem are examined. (Bacc Core Course)

Attributes: CSGI – Core, Synth, Global Issues

Recommended: One year of college biology or chemistry

BI 306, *ENVIRONMENTAL ECOLOGY, 3 Credits

Biological, physical, and chemical nature of both natural and human-disturbed ecosystems. Topics include population and conservation ecology, toxins in the food chain and in the environment, forest decline and acid rain, eutrophication of terrestrial and aquatic ecosystems, and ecosystem restoration. Offered alternate years. (Bacc Core Course)

Attributes: CSGI – Core, Synth, Global Issues

Equivalent to: BI 306H

Recommended: One year of college biology and chemistry

BI 306H, *ENVIRONMENTAL ECOLOGY, 3 Credits

Biological, physical, and chemical nature of both natural and human-disturbed ecosystems. Topics include population and conservation ecology, toxins in the food chain and in the environment, forest decline and acid rain, eutrophication of terrestrial and aquatic ecosystems, and ecosystem restoration. Offered alternate years. (Bacc Core Course)

Attributes: CSGI – Core, Synth, Global Issues; HNRS – Honors Course Designator

Equivalent to: BI 306

Recommended: One year of college biology and chemistry

BI 309, TEACHING PRACTICUM, 1-6 Credits

Introductory experience for students assisting with instruction in Biology or Zoology courses. Admission is by application. See Cordley 3029 for details.

This course is repeatable for 6 credits.

BI 311, GENETICS, 4 Credits

Fundamentals of Mendelian, quantitative, population, molecular, and developmental genetics. Lec/rec.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])

Equivalent to: BI 311H

Available via Ecampus

BI 311H, GENETICS, 4 Credits

Fundamentals of Mendelian, quantitative, population, molecular, and developmental genetics. Lec/rec.

Attributes: HNRS – Honors Course Designator

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])

Equivalent to: BI 311

BI 315, MOLECULAR BIOLOGY LABORATORY, 3 Credits

Laboratory projects exploring the transmission of genetic information from storage to function will introduce students to fundamental molecular biology concepts and techniques, including isolation of DNA, construction of recombinant plasmids, quantification of gene expression in model organisms, polymerase chain reaction, and analysis of protein expression and subcellular localization. Lec/lab.

Prerequisite: BB 314 with C- or better or BB 314H with C- or better

Equivalent to: BB 315

BI 319, ^THEORY, PRACTICE AND DISCOURSE IN THE LIFE SCIENCES, 3 Credits

The practice of science and the critical evaluation of scientific claims are explored through writings, discussions and presentations. Topics including the scientific method, ethics and the role of science in society are examined along with implications for professionals ranging from health care to environmental biology. Strategies for effectively communicating science with diverse audiences are emphasized. (Writing Intensive Course).

Attributes: CWIC – Core, Skills, WIC

Prerequisite: (((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-]))) and (ST 351 [D-] or ST 351H [D-])

Available via Ecampus

BI 331, ADVANCED HUMAN ANATOMY AND PHYSIOLOGY, 3 Credits

The first of a three-term advanced series. With a strong focus on the physiological underpinnings of disease, course topics address the fundamental concepts of human anatomy and physiology and then focus on understanding the structures, functions, regulatory mechanisms and common pathologies involved in the skeletal, muscular and integumentary systems. Lec.

Prerequisite: (((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-]))) and (CH 123 [C-] or ((CH 233 [C-] or CH 233H [C-]) and (CH 263 [C-] or CH 263H [C-]))) and BI 341 (may be taken concurrently) [C-]

BI 332, ADVANCED HUMAN ANATOMY AND PHYSIOLOGY, 3 Credits

The second of a three-term advanced series. With a strong focus on the physiological underpinnings of disease, course topics address the structures, functions, and regulatory mechanisms involved in the nervous, endocrine and reproductive systems. Lec.

Prerequisite: BI 331 with C- or better and BI 342 (may be taken concurrently) [C-]

BI 333, ADVANCED HUMAN ANATOMY AND PHYSIOLOGY, 3 Credits

The third part of a three-term advanced series. With a strong focus on the physiological underpinnings of disease, course topics address the structures, functions, and regulatory mechanisms involved in the cardiovascular, respiratory, urinary and digestive systems. Lec.

Prerequisite: BI 332 with C- or better and BI 343 (may be taken concurrently) [C-]

BI 341, ADVANCED HUMAN ANATOMY AND PHYSIOLOGY LABORATORY, 2 Credits

The first of a three-term advanced series. Using the human cadaver (prosection) and physiological data acquisition equipment, course topics address the fundamental concepts of human anatomy and physiology and then focus on understanding the structures, functions, regulatory mechanisms and common pathologies involved in the human skeletal, muscular and integumentary systems. Lab.

Corequisites: BI 331

BI 342, ADVANCED HUMAN ANATOMY AND PHYSIOLOGY LABORATORY, 2 Credits

The second of a three-term advanced series. Using the human cadaver (prosection), dissection of preserved specimens, and physiological data acquisition equipment, course topics address the structures, functions, regulatory mechanisms and common pathologies involved in the human nervous, endocrine and reproductive systems. Lab.

Corequisites: BI 332

BI 343, ADVANCED HUMAN ANATOMY AND PHYSIOLOGY LABORATORY, 2 Credits

The third of a three-term advanced series. Using the human cadaver (prosection), dissection of preserved specimens, and physiological data acquisition equipment, course topics address the structures, functions, regulatory mechanisms and common pathologies involved in the human cardiovascular, respiratory, urinary and digestive systems. Lab.

Corequisites: BI 333

BI 345, *INTRODUCTION TO EVOLUTION, 3 Credits

Elements of evolutionary theory; origin and history of life; evolutionary controversy; origins of species, sex, and humans. (Bacc Core Course)

Attributes: CSST – Core, Synthesis, Science/Technology/Society

Equivalent to: Z 345

Available via Ecampus

BI 347, *OCEANS IN PERIL, 3 Credits

The interactions of society and the marine environment, emphasizing the ecological, biogeochemical, economic, sociological, and political significance of the oceans. Topics of current critical importance will include marine pollution, protecting marine habitats, conserving marine biodiversity, fisheries and aquaculture, ocean energy, biogeochemical change, global warming, ocean acidification, and sea level rise. (Bacc Core Course)

Attributes: CSST – Core, Synthesis, Science/Technology/Society

Prerequisite: BI 101 with C- or better or BI 102 with C- or better or BI 211 with C- or better or BI 211H with C- or better or BI 213 with C- or better or BI 213H with C- or better or BI 204 with C- or better or BI 150 with C- or better or BI 221 with C- or better or BI 221H with C- or better

Available via Ecampus

BI 348, *HUMAN ECOLOGY, 3 Credits

The impact of humans on the environment, emphasizing the political, sociological, and ecological consequences of human population growth. Topics of current critical importance will include global warming trends, destruction of the ozone layer, consequences of pollution, habitat destruction, the loss of biodiversity, and conservation biology. (Bacc Core Course)

Attributes: CSST – Core, Synthesis, Science/Technology/Society

Equivalent to: Z 348

Available via Ecampus

BI 351, MARINE ECOLOGY, 3 Credits

Ecological interactions and principles in different marine habitats. Topics include the organisms (plants, invertebrates, vertebrates) found in major habitats and interactions between organisms. Habitats discussed include coral reefs, rocky shores, kelp forests, near-shore waters, open-ocean waters, and the deep sea. Emphasis is placed on how organism-organism interactions produce varying patterns of distribution, abundance, body size, diversity, stability, and succession.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])

Equivalent to: Z 351

Available via Ecampus

BI 353, PACIFIC NORTHWEST COASTAL ECOSYSTEMS, 4 Credits

A field-based introduction to the diversity of ecosystems of the Pacific Northwest coast. Biological and physical processes affecting the distribution, structure, community composition and physical features of these systems are explored through a variety of lectures and field trips. Ecosystem services and human impacts are examined.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])

BI 358, SYMBIOSES AND THE ENVIRONMENT, 3 Credits

Overview of the diversity of mutualistic symbioses and their roles in the natural environment. Integrative approach, from ecosystem to molecule, to the examination of certain key mutualisms. Lec. Offered alternate years.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-]) and (CH 123 [C-] or (CH 233 [C-] or CH 233H [C-]) and (CH 263 [C-] or CH 263H [C-]))

BI 370, ECOLOGY, 3 Credits

The study of interactions between organisms and their biotic and abiotic environments at the population, community, ecosystem, and biosphere levels of organization.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])

Equivalent to: BI 370H

Available via Ecampus

BI 370H, ECOLOGY, 3 Credits

The study of interactions between organisms and their biotic and abiotic environments at the population, community, ecosystem, and biosphere levels of organization.

Attributes: HNRS – Honors Course Designator

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])

Equivalent to: BI 370

BI 371, ^ECOLOGICAL METHODS, 3 Credits

Experimental design, data collection, analysis and synthesis in ecological studies; local ecosystems emphasized. May have field trip fee. Lec/lab. (Writing Intensive Course)

Attributes: CWIC – Core, Skills, WIC

Prerequisite: BI 370 with D- or better or BI 370H with D- or better

BI 373, ^FIELD METHODS IN MARINE ECOLOGY, 3 Credits

Exposure to research methods used in field studies of the marine rocky intertidal ecosystem. Research projects and writing exercises provide students with hands-on experience of collecting, analyzing, and presenting marine ecological data. Field trip fee. Lab fee. Lec/lab. (Writing Intensive Course)

Attributes: CWIC – Core, Skills, WIC

Prerequisite: (BI 351 (may be taken concurrently) with D- or better or BI 370 with D- or better or BI 370H with D- or better) and (ST 351 [D-] or ST 351H [D-])

Recommended: ST 352

BI 375, FIELD METHODS IN ECOLOGICAL RESTORATION, 4 Credits

Observation and application of theory and practice in ecological restoration. Using site visits and hands-on research, explores the roles in restoration of fire, local adaptation, disturbance history, natural history, beaver, and soils, including visits to several active and completed restoration projects and overnights in the field. Lab.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])

BI 399, SPECIAL TOPICS, 0-16 Credits

May be repeated for 16 total credits.

Equivalent to: BI 399H

This course is repeatable for 16 credits.

BI 401, RESEARCH AND SCHOLARSHIP, 1-16 Credits

Equivalent to: BI 401H

This course is repeatable for 16 credits.

BI 401H, RESEARCH AND SCHOLARSHIP, 1-16 Credits

Attributes: HNRS – Honors Course Designator

Equivalent to: BI 401

This course is repeatable for 16 credits.

BI 405, READING AND CONFERENCE, 1-16 Credits

Equivalent to: BI 405H

This course is repeatable for 16 credits.

BI 406, PROJECTS: CURATORIAL ASSISTANT, 1-6 Credits

Students assist with curatorial projects in OSU biological collections.

Admission is by application. See Cordley 3029 for details.

This course is repeatable for 6 credits.

BI 407, SEMINAR, 1 Credit

Departmental seminar. Graded P/N.

Equivalent to: BI 407H, BI 407H, BOT 407, BOT 407H

This course is repeatable for 16 credits.

BI 407H, SEMINAR, 1 Credit

Departmental seminar. Graded P/N.

Attributes: HNRS – Honors Course Designator

Equivalent to: BI 407

This course is repeatable for 16 credits.

BI 409, ADVANCED TEACHING PRACTICUM, 1-6 Credits

Advanced practicum experience for students assisting in Biology or Zoology courses. Includes advanced training in course content and development of instructional materials. Admission is by application. See Cordley 3029 for details.

This course is repeatable for 6 credits.

BI 410, INTERNSHIP, 1-16 Credits

Graded P/N.

This course is repeatable for 16 credits.

Available via Ecampus

BI 420, *VIRUSES IN MODERN SOCIETY, 3 Credits

Impact of viruses on modern civilization. Molecular mechanisms of viral infectivity. Approaches to the prevention and cure of viral diseases. Role of viruses in agriculture and industry. Offered alternate years. (Bacc Core Course)

Attributes: CSST – Core, Synthesis, Science/Technology/Society

Prerequisite: BI 311 with D- or better or BI 311H with D- or better or BI 314 with D- or better or BI 314H with D- or better

BI 427, PALEOBIOLOGY, 4 Credits

Fossils provide a direct window into the evolution, extinction, and ecology of past life on Earth. A process-based study of the marine and terrestrial fossil record is taken to explore the topics of preservation, macroevolution, extinction of biotas, biomechanics, paleoecology, and climate change. Required laboratory and weekend field trip.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-]) or GEO 203 [D-]

Equivalent to: Z 427

BI 445, EVOLUTION, 3 Credits

Formal analysis of genetic and ecological mechanisms producing evolutionary change; special topics include speciation, ecological constraints, adaptive radiations, paleontology, biogeography, the origin of life, molecular evolution, and human evolution.

Prerequisite: BI 311 with D- or better or BI 311H with D- or better

Equivalent to: BI 445H

BI 445H, EVOLUTION, 3 Credits

Formal analysis of genetic and ecological mechanisms producing evolutionary change; special topics include speciation, ecological constraints, adaptive radiations, paleontology, biogeography, the origin of life, molecular evolution, and human evolution.

Attributes: HNRS – Honors Course Designator

Prerequisite: BI 311 with D- or better or BI 311H with D- or better

Equivalent to: BI 445

BI 450, ^MARINE BIOLOGY AND ECOLOGY, 15 Credits

A comprehensive lecture and laboratory introduction to the flora and fauna of the marine environment approached from the level of the organism to ecosystem. Ecological patterns and processes characteristic of marine communities will be emphasized. Lec/lab. Taught at Hatfield Marine Science Center, Newport, OR. (Writing Intensive Course)

Attributes: CWIC – Core, Skills, WIC

Prerequisite: (BI 370 with D- or better or BI 370H with D- or better) and (ST 351 [D-] or ST 351H [D-])

Recommended: ST 352

Available via Ecampus

BI 451, FUNCTIONAL ANATOMY OF THE HUMAN MUSCULAR SYSTEM, 4 Credits

In-depth dissection of the orientation, innervation, and functional significance of muscles and muscle groups. Topics include muscle identification, joint anatomy and variation of human form. BI 451 student expectations include vascularization and detailed joint anatomy. The laboratory component will consist of the dissection of the muscular anatomy of a human cadaver. Lab fee. Lec/lab.

Prerequisite: ((BI 231 with D- or better and BI 241 [D-]) or (BI 331 [D-] and BI 341 [D-])) and ((BI 232 [D-] and BI 242 [D-]) or (BI 332 [D-] and BI 342 [D-])) and ((BI 233 [D-] and BI 243 [D-]) or (BI 333 [D-] and BI 343 [D-]))

Equivalent to: Z 451

BI 454, EVOLUTIONARY GENOMICS, 3 Credits

Examines the evolutionary forces that have produced such varied and complex genomes across the tree of life. The processes by which genomes can be structured, maintained, and remodeled (by nature or by humans) are explored through scientific literature. Special emphasis will be given to recent technological advances in genomics, along with their potential impacts on individuals and society.

Prerequisite: BI 311 with D- or better or BI 311H with D- or better

BI 456, PHYLOGENETICS, 4 Credits

Explores the theory and practice of modern phylogenetic analysis. Emphasis placed on tree reconstruction algorithms, assessment of statistical support, and contemporary issues in phylogenetics. Lab will focus on the use of phylogenetic software and the analysis of molecular data sets. Lec/lab.

Prerequisite: (ST 351 with D- or better or ST 351H with D- or better) and (ST 352 (may be taken concurrently) [D-] or ST 411 (may be taken concurrently) [D-]) and (BI 311 [D-] or BI 311H [D-] or BI 445 [D-] or BI 445H [D-])

BI 481, BIOGEOGRAPHY, 3 Credits

Biogeography is the study of the distribution of biodiversity. We focus on abiotic (geological, climatological) and biotic (ecological, evolutionary) factors that govern diversity across space and through time, emphasizing assembly of communities, global change, and conservation in today's rapidly changing world. The course format includes lecture, computer-based activities, and discussion. Offered winter term in odd years.

Prerequisite: BI 370 with D- or better or BI 370H with D- or better

Equivalent to: Z 481

BI 483, POPULATION BIOLOGY, 3 Credits

Theoretical and empirical views of the structure and function of populations from across the tree of life, emphasizing the integration of ecological and evolutionary approaches. Lec.

Prerequisite: (MTH 241 with D- or better or MTH 251 with D- or better or MTH 251H with D- or better or MTH 227 with D- or better) and (ST 351 [D-] or ST 351H [D-]) and (ST 352 (may be taken concurrently) [D-] or ST 411 (may be taken concurrently) [D-]) and (BI 311 [D-] or BI 311H [D-] or BI 370 [D-] or BI 370H [D-])

Available via Ecampus

BI 485, MONSTER BIOLOGY, 3 Credits

Scientists seek to explain what exists and why things are. An alternative approach is to ask why things are not. Biological and physical laws are used to critically and rigorously assess why monsters from literature, television and film are not possible in the real world.

Prerequisite: (BI 311 (may be taken concurrently) with D- or better or BI 311H (may be taken concurrently) with D- or better) and (BI 370 (may be taken concurrently) [D-] or BI 370H (may be taken concurrently) [D-])

BI 495, DISEASE ECOLOGY, 3 Credits

An introduction to disease ecology—the study of disease processes in natural populations and communities. The course focuses on (I) the role parasites play in the ecology and evolution of animal populations, including humans; and (II) the relevance of ecological and evolutionary considerations in managing infectious diseases.

Prerequisite: BI 370 with C- or better or BI 370H with C- or better

BI 498, SENIOR BIOLOGY FIELD TEST, 0 Credits

A comprehensive, two-hour exam to assess the biological knowledge of Biology and Zoology seniors. Students must complete the exam in their final undergraduate term or during spring term if graduating during summer when it is not offered. A pass will be given to all students who complete the exam. More details at <http://ib.oregonstate.edu/advising/MFT-info>.

Available via Ecampus

BI 499, SPECIAL TOPICS, 0-16 Credits

Topics and credits vary.

Equivalent to: BI 499H

This course is repeatable for 16 credits.

BI 499H, SPECIAL TOPICS, 1-16 Credits

Topics and credits vary.

Attributes: HNRS – Honors Course Designator

Equivalent to: BI 499

This course is repeatable for 16 credits.

Integrative Biology (IB)**IB 501, RESEARCH, 1-16 Credits**

Graduate-level research completed under faculty supervision.

Equivalent to: Z 501

This course is repeatable for 16 credits.

IB 503, THESIS, 1-16 Credits

Master's thesis, completed under faculty supervision.

Equivalent to: Z 503

This course is repeatable for 999 credits.

IB 505, READING AND CONFERENCE, 1-16 Credits

For graduate students working toward a master's degree. After arrangements with individual faculty, readings and discussions on topics of mutual interest.

Equivalent to: Z 505

This course is repeatable for 16 credits.

IB 506, PROJECTS: OUTREACH, 1-16 Credits

Graded P/N.

Equivalent to: BI 506

This course is repeatable for 16 credits.

IB 507, SEMINAR, 1-16 Credits

Graded P/N.

Equivalent to: Z 507

This course is repeatable for 16 credits.

IB 510, INTERNSHIP, 1-16 Credits

Equivalent to: Z 510

This course is repeatable for 16 credits.

IB 511, INTEGRATIVE BIOLOGY GRADUATE STUDENT ORIENTATION, 2 Credits

Introduction to the graduate program in Integrative Biology and at OSU in general. Class introduces students to various skills for success in graduate school and beyond. Exploration of career options for those holding a degree in IB are explored. Graded P/N.

IB 512, INTEGRATIVE BIOLOGY GTA TRAINING AND DEVELOPMENT, 1 Credit

Provides instructional support and professional development for first year graduate teaching assistants (GTAs) in Integrative Biology. Focuses on developing a foundation for quality instruction, facilitation, and leadership as GTAs and professionals. Best practices, skills, theory and knowledge necessary for effective teaching, facilitation, and assessment of student learning are explored.

This course is repeatable for 3 credits.

IB 513, GRANT WRITING AND ETHICS, 3 Credits

Participants will write and submit a grant proposal by the end of the term. We discuss the main components of a typical grant proposal. Participants read and critique proposal drafts written by participants. Ethical issues are discussed as they are encountered.

Equivalent to: Z 585

This course is repeatable for 6 credits.

IB 515, SCIENCE COMMUNICATION: MAKING YOUR SCIENCE MATTER, 2 Credits

A practical, hands-on course designed to help science graduate students build knowledge and skills for engaging with audiences beyond their scientific peers. The science of science communication, the cultures of journalism and public policy, the changing roles of scientists in society, and science advocacy will be explored through lectures, invited talks, in-class discussions and exercises.

IB 518, SCIENCE AND POLICY, 2 Credits

An introduction to the science-policy interface in a 'post-truth' society. The formulation of state and federal public policy is examined, as well as and role of science and scientist in informing policy, management decisions and public understanding. Current topics are emphasized.

IB 522, COMPARATIVE/FUNCTIONAL VERTEBRATE ANATOMY, 5 Credits

Phylogenetically-based study of the form and function of vertebrate organ systems, including integumentary, musculoskeletal, cardiopulmonary, digestive, and sensory. Lab emphasizes comparative form through dissection, and function through non-invasive experimentation. Lec/lab.

Equivalent to: Z 522

IB 523, ENVIRONMENTAL PHYSIOLOGY, 3 Credits

Comparative environmental physiology of animals with emphasis on adaptations to such aspects of the physical environment as temperature, water, ions, and gases. Consideration given to interactions between physiology and environment that influence the local and geographic distribution of animals.

Equivalent to: Z 523

IB 525, EMBRYOLOGY AND DEVELOPMENT, 5 Credits

An integrated molecular, cellular and whole organism approach. Comparative embryonic development from gametogenesis, body axis specification, pattern formation and organogenesis. Experimental approaches uncovering cellular interactions, regulation of gene expression, and cellular differentiation. Lab emphasizes experimental comparative developmental biology and embryology. Lab fee. Lec/lab.

Equivalent to: Z 525

IB 527, PALEOBIOLOGY, 0-4 Credits

Fossils provide a direct window into the evolution, extinction, and ecology of past life on Earth. A process-based study of the marine and terrestrial fossil record is taken to explore the topics of preservation, macroevolution, extinction of biotas, biomechanics, paleoecology, and climate change. Required laboratory and weekend field trip.

Equivalent to: BI 527

IB 531, VERTEBRATE PHYSIOLOGY I, 4 Credits

Systems/concepts covered include motor reflexes, autonomic nervous system, digestion/metabolism, renal and osmoregulatory, endocrine and reproductive systems. First in IB 531, IB 532 series.

IB 532, VERTEBRATE PHYSIOLOGY II, 3 Credits

Systems/concepts covered include blood, immune, lymphatic, cardiovascular, and pulmonary. Second in the IB 531, IB 532 series.

Equivalent to: Z 532

IB 538, BEHAVIORAL NEUROBIOLOGY, 3 Credits

An introduction to the neurobiological basis of animal behavior. Examines behavior in the context of sensory physiology, motor control, neural circuitry, and cellular processes. Lec.

Equivalent to: Z 538

IB 540, INSECT PHYSIOLOGY, 3 Credits

Fundamentals of insect physiology from the behavioral to the molecular level. Cellular physiology and hormonal control of molting, metamorphosis and reproduction. Overview of body functions: respiration, circulation, digestion, metabolism, and osmoregulation. Physiological basis of behavior: muscles and flight, structure and functions of the nervous system, sensory physiology and chemical communication. The contributions of insect physiology to general physiological principles and biorational methods of insect pest control are discussed.

Equivalent to: Z 540

IB 545, EVOLUTION, 3 Credits

Formal analysis of genetic and ecological mechanisms producing evolutionary change; special topics include speciation, ecological constraints, adaptive radiations, paleontology, biogeography, the origin of life, molecular evolution, and human evolution.

Equivalent to: BI 545

IB 551, FUNCTIONAL ANATOMY OF THE HUMAN MUSCULAR SYSTEM, 4 Credits

In-depth dissection of the orientation, innervation, and functional significance of muscles and muscle groups. Topics include muscle identification, joint anatomy and variation of human form. IB 551 student expectations include vascularization and detailed joint anatomy. The laboratory component will consist of the dissection of the muscular anatomy of a human cadaver. Lab fee. Lec/lab.

Equivalent to: BI 551

Recommended: ((BI 231 and 241) or (BI 331 and 341)) and ((BI 232 and 242) or (BI 332 and 342)) and ((BI 233 and 243) or (BI 333 and 343))

IB 554, EVOLUTIONARY GENOMICS, 3 Credits

Examines the evolutionary forces that have produced such varied and complex genomes across the tree of life. The processes by which genomes can be structured, maintained, and remodeled (by nature or by humans) are explored through scientific literature. Special emphasis will be given to recent technological advances in genomics, along with their potential impacts on individuals and society.

IB 556, PHYLOGENETICS, 4 Credits

Explores the theory and practice of modern phylogenetic analysis. Emphasis placed on tree reconstruction algorithms, assessment of statistical support, and contemporary issues in phylogenetics. Lab will focus on the use of phylogenetic software and the analysis of molecular data sets. Lec/lab.

Equivalent to: BI 556

IB 561, MARINE AND ESTUARINE INVERTEBRATE ZOOLOGY, 4 Credits

Comparative survey of eight major invertebrate phyla and many lesser-known phyla. Areas of emphasis will be 1) invertebrate identification, 2) natural history (diversity, habitat, feeding, behavior), and 3) comparative anatomy (adaptive significance of morphological structures).

Laboratories and field trips will strongly supplement lecture material. Lec/lab. Taught at Hatfield Marine Science Center.

Equivalent to: Z 561

IB 573, HERPETOLOGY, 3 Credits

World families and distribution of amphibians and non-avian sauro pods; evolution, population biology, life histories, current literature.

Equivalent to: Z 573

IB 574, SYSTEMATIC HERPETOLOGY, 2 Credits

A survey of the phylogenetic diversity of amphibians and reptiles of the United States. Identification through the use of keys will be stressed.

Field trip fee. Lab fee. Lec/lab.

Equivalent to: Z 574

IB 577, AQUATIC ENTOMOLOGY, 4 Credits

Biology, ecology, collection, and identification of aquatic insects. Two required Saturday field trips. Lec/lab.

Equivalent to: Z 577

IB 581, BIOGEOGRAPHY, 3 Credits

Biogeography is the study of the distribution of biodiversity. We focus on abiotic (geological, climatological) and biotic (ecological, evolutionary) factors that govern diversity across space and through time, emphasizing assembly of communities, global change, and conservation in today's rapidly changing world. The course format includes lecture, computer-based activities, and discussion. Offered winter term in odd years.

Equivalent to: BI 581

IB 583, POPULATION BIOLOGY, 3 Credits

Theoretical and empirical views of the structure and function of populations from across the tree of life, emphasizing the integration of ecological and evolutionary approaches. Lec.

Equivalent to: BI 583

IB 592, THEORETICAL ECOLOGY, 4 Credits

A treatment of the central concepts of theoretical ecology, with emphasis on the analysis and modeling of single populations and multispecies communities. Topics include discrete- and continuous-time models of population growth, stochastic and deterministic processes, and the response of populations and communities to pulse and press perturbations.

Equivalent to: BI 592

IB 593, BEHAVIORAL ECOLOGY, 5 Credits

Behavioral ecology with emphasis on both theoretical and empirical approaches. Offered alternate years.

Equivalent to: Z 593

IB 594, COMMUNITY ECOLOGY, 5 Credits

Theory and analysis of multispecies associations. Emphasis on extent to which existing ecological theory is supported by natural phenomena. Course considers how biotic and abiotic mechanisms interact to regulate community organization and stability in marine, freshwater, and terrestrial habitats. Offered alternate years.

Equivalent to: Z 594

IB 595, DISEASE ECOLOGY, 3 Credits

An introduction to disease ecology—the study of disease processes in natural populations and communities. The course focuses on (I) the role parasites play in the ecology and evolution of animal populations, including humans; and (II) the relevance of ecological and evolutionary considerations in managing infectious diseases.

Equivalent to: BI 595

IB 599, SPECIAL TOPICS, 1-16 Credits

Topics and credits vary. Grading mode TBA. Taught at Hatfield Marine Science Center and Corvallis campus.

Equivalent to: Z 599

This course is repeatable for 16 credits.

IB 601, RESEARCH, 1-16 Credits

Doctoral-level research under faculty supervision. Graded P/N.

Equivalent to: Z 601

This course is repeatable for 16 credits.

IB 603, THESIS, 1-16 Credits

Doctoral thesis completed under faculty supervision.

Equivalent to: Z 603

This course is repeatable for 999 credits.

IB 605, READING AND CONFERENCE, 1-16 Credits

For graduate students working toward doctoral degree. After arrangements with individual faculty, readings and discussions on topics of mutual interest.

Equivalent to: Z 605

This course is repeatable for 16 credits.

Zoology (Z)**Z 349, *BIODIVERSITY: CAUSES, CONSEQUENCES, AND CONSERVATION, 3 Credits**

The earth's biodiversity is a precious inheritance that is threatened by an unprecedented extinction crisis. This course examines the evolutionary and ecological processes that have created this unique diversity of life, the importance of biodiversity in maintaining the earth's ecosystems, and methods used to conserve biodiversity for future generations. (Bacc Core Course)

Attributes: CSGI – Core, Synth, Global Issues

Equivalent to: BI 349

Available via Ecampus

Z 350, ANIMAL BEHAVIOR, 3 Credits

Concepts of behavior; sensory receptors, internal mechanisms governing responses; learning and habituation; social organization and communication.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])

Equivalent to: BI 350

Available via Ecampus

Z 361, INVERTEBRATE BIOLOGY, 3 Credits

Exploration of the diversity and evolutionary relationships among major invertebrate phyla with an emphasis on morphological features, functional aspects, and life history for each phylum.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])

Z 362, INVERTEBRATE BIOLOGY LABORATORY, 2 Credits

Morphology and anatomy of representative invertebrates introduced in Z 361; diversity within phyla. Study is by dissections and both microscopic and macroscopic examination; field trip fee. Lab fee. Lec/lab.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) and Z 361 (may be taken concurrently) [C-]

Z 364, DIVERSITY OF LIFE: INVERTEBRATES, 5 Credits

Exploration of the diversity and evolutionary relationships among major invertebrate groups with an emphasis on building and interpreting phylogenetic trees as well as comparing and contrasting morphology, function, and life history within each group. Laboratory activities build scientific skills by exploring current hypotheses and tools for the study of invertebrate evolution.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])

Available via Ecampus

Z 365, BIOLOGY OF INSECTS, 4 Credits

Introduction to the study of insects, focusing on the biological attributes responsible for the success and dominance of insects. Emphasis on taxonomy, morphology, behavior, ecology, and coevolutionary interrelationships. Required field trips. Lec/lab.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])

Z 371, VERTEBRATE BIOLOGY, 3 Credits

Overview of vertebrate origins and phylogeny integrating several disciplines (anatomy, ecology, genetics, developmental biology, physiology, behavior, and evolution) to explore the structural and functional adaptations and evolutionary history of vertebrates. Lec.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])

Recommended: Completion or concurrent enrollment in Z 372

Z 372, VERTEBRATE BIOLOGY LABORATORY, 2 Credits

Classification, identification, and natural history of vertebrates. Includes laboratory examination of specimens and frequent field trips (fee charged) emphasizing Oregon fauna. Lab fee.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-]) and Z 371 (may be taken concurrently) [D-]

Z 374, DIVERSITY OF LIFE: VERTEBRATES, 5 Credits

Examination of vertebrate origins and phylogeny, integrating several disciplines (molecular biology, anatomy, behavioral ecology, and evolution). Emphasizes critical thinking and the scientific process to explore the structural/functional adaptations and evolutionary history of vertebrates. Laboratory activities build scientific skills by exploring current hypotheses and tools for the study of vertebrate evolution.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])

Z 422, COMPARATIVE/FUNCTIONAL VERTEBRATE ANATOMY, 5 Credits

Phylogenetically-based study of the form and function of vertebrate organ systems, including integumentary, musculoskeletal, cardiopulmonary, digestive, and sensory. Lab emphasizes comparative form through dissection, and function through non-invasive experimentation. Lec/lab.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) and (CH 332 (may be taken concurrently) [D-] or CH 335 (may be taken concurrently) [D-])

Z 423, ENVIRONMENTAL PHYSIOLOGY, 3 Credits

Comparative environmental physiology of animals with emphasis on adaptations to such aspects of the physical environment as temperature, water, ions, and gases. Consideration given to interactions between physiology and environment that influence the local and geographic distribution of animals.

Prerequisite: (((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])) and (CH 123 [C-] or (CH 233 [C-] or CH 233H [C-]) and (CH 263 [C-] or CH 263H [C-]))

Available via Ecampus

Z 425, EMBRYOLOGY AND DEVELOPMENT, 5 Credits

An integrated molecular, cellular and whole organism approach. Comparative embryonic development from gametogenesis, body axis specification, pattern formation and organogenesis. Experimental approaches uncovering cellular interactions, regulation of gene expression, and cellular differentiation. Lab emphasizes experimental comparative developmental biology and embryology. Lab fee. Lec/lab.

Prerequisite: (BI 311 with D- or better or BI 311H with D- or better) and (BI 314 [D-] or BI 314H [D-] or BB 314 [D-] or BB 314H [D-])

Z 431, VERTEBRATE PHYSIOLOGY I, 4 Credits

Systems/concepts covered include motor reflexes, autonomic nervous system, digestion/metabolism, renal and osmoregulatory, endocrine and reproductive systems. First in Z 431, Z 432/Z 442 series. Lec/rec.

Prerequisite: (((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-]))) and (CH 332 (may be taken concurrently) [C-] or CH 335 (may be taken concurrently) [C-])

Z 432, VERTEBRATE PHYSIOLOGY II, 3 Credits

Systems/concepts covered include blood, immune, lymphatic, cardiovascular, and pulmonary. Second in the Z431, 432/442 series.

Prerequisite: Z 431 with C- or better

Z 438, BEHAVIORAL NEUROBIOLOGY, 3 Credits

An introduction to the neurobiological basis of animal behavior. Examines behavior in the context of sensory physiology, motor control, neural circuitry, and cellular processes. Lec.

Prerequisite: (((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])) and (CH 123 [C-] or (CH 233 [C-] or CH 233H [C-]) and (CH 263 [C-] or CH 263H [C-]))

Z 442, VERTEBRATE PHYSIOLOGY LABORATORY, 2 Credits

Experiments and exercises in vertebrate physiology covering systems studied in Z 431 and Z 432. Available to Biology majors. Lab fee.

Prerequisite: Z 431 with C- or better and Z 432 (may be taken concurrently) [C-]

Z 461, MARINE AND ESTUARINE INVERTEBRATE ZOOLOGY, 4 Credits

Comparative survey of eight major invertebrate phyla and many lesser-known phyla. Areas of emphasis will be 1) invertebrate identification, 2) natural history (diversity, habitat, feeding, behavior), and 3) comparative anatomy (adaptive significance of morphological structures).

Laboratories and field trips will strongly supplement lecture material. Lec/lab. Taught at Hatfield Marine Science Center.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])

Z 473, HERPETOLOGY, 4 Credits

Exploration of global herpetofauna focusing on taxa of the Pacific Northwest of North America. Identification and natural history of amphibians and reptiles are emphasized, along with a phylogenetic framework, to explore and discuss ideas involving their behavior, evolution, ecology, and conservation. Student projects examine important topics in the field.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])

Available via Ecampus

Z 477, AQUATIC ENTOMOLOGY, 4 Credits

Biology, ecology, collection, and identification of aquatic insects. Two required Saturday field trips. Lec/lab.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])

Z 499, SPECIAL TOPICS, 0-16 Credits

Topics and credits vary.

Equivalent to: Z 499H

This course is repeatable for 16 credits.

Z 499H, SPECIAL TOPICS, 1-16 Credits

Topics and credits vary.

Equivalent to: Z 499

This course is repeatable for 16 credits.