

# 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 the 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 537. VERTEBRATE ENDOCRINOLOGY. (4 Credits)

An exploration of vertebrate endocrinology that examines principles of hormone action, inter- and intracellular signaling mechanisms within endocrine axes, and comparative endocrine physiology, emphasizing concepts of homeostasis and methodologies for evaluating normal and physiological function. Students are provided multiple forums for class participation, in the form of scientific presentations and "mini-reports."

**Equivalent to:** Z 537

## 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 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 sauropods; 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.*