

# IB - INTEGRATIVE BIOLOGY

IB Class Schedule (<https://courses.illinois.edu/schedule/DEFAULT/DEFAULT/IB/>)

## Courses

IB 100 Biology in Today's World credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/IB/100/>)  
Introduction to biology for the non-major. In-depth focus on three contemporary problems-maintaining a livable environment, issues of human health, and evolution.

This course satisfies the General Education Criteria for:  
Nat Sci Tech - Life Sciences

IB 103 Introduction to Plant Biology credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/103/>)  
Basic principles of growth and form, physiology, genetics, evolution, and ecology in plant biology. Lecture and laboratory.

This course satisfies the General Education Criteria for:  
Nat Sci Tech - Life Sciences

IB 104 Animal Biology credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/104/>)

Introductory zoological concepts with emphasis on the diversity and comparative anatomy of animals and the fundamentals of physiology, genetics, evolution, and behavior. Lecture and laboratory.

This course satisfies the General Education Criteria for:  
Nat Sci Tech - Life Sciences

IB 105 Environmental Biology credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/IB/105/>)

Introduction to ecological principles in relation to understanding environmental problems; course emphasizes impacts upon ecosystems by human activities such as air and water pollution, usage of pesticides and pest control measures, expansion of agriculture in tropics and arid regions, harvesting the oceans, and development of energy sources.

This course satisfies the General Education Criteria for:  
Nat Sci Tech - Life Sciences

IB 108 The Biology of Dinosaurs credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/IB/108/>)

The origin, diversity, and extinction of dinosaurs will serve as a conceptual framework to explore fundamental principles of biology. We will consider dinosaurs as animals, examining evidence for their physiology and behavior, and how evolution and speciation produced the diversity of dinosaurs. We will relate the influence of Earth's changing environments on dinosaurs to environmental change on human timescales. We will emphasize how scientists collect and evaluate fossil data through an understanding of living organisms.

This course satisfies the General Education Criteria for:  
Nat Sci Tech - Life Sciences

IB 110 Race and Environmental Biology credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/IB/110/>)

The environment each person experiences is created by cultural, biological, and political factors. We will explore how race and culture shape environment and the underlying biological processes that influence the people and organisms that occur in these environments. We will also explore how politics can further shape environments for various racial and ethnic groups.

This course satisfies the General Education Criteria for:  
Nat Sci Tech - Life Sciences  
Cultural Studies - US Minority

IB 150 Organismal & Evolutionary Biol credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/150/>)

Introduction to physiology, genetics, and evolution of organisms, and their ecology and diversity.

This course satisfies the General Education Criteria for:  
Nat Sci Tech - Life Sciences

IB 151 Organismal & Evol Biol Lab credit: 1 Hour. (<https://courses.illinois.edu/schedule/terms/IB/151/>)

Topics follow lecture topics in IB 150 and include labs in ecology, plant and animal function, and genetics and evolution. Designed for non-majors needing a year of biology with lab. Credit is not given for IB 151 for Integrative Biology or Molecular and Cellular Biology majors. Prerequisite: Credit or concurrent registration in IB 150.

IB 199 Undergraduate Open Seminar credit: 0 to 5 Hours. (<https://courses.illinois.edu/schedule/terms/IB/199/>)

Approved for both letter and S/U grading. May be repeated to a maximum of 5 hours.

IB 201 Organismal Genetics credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/IB/201/>)

Genetics is one of the unifying frameworks shared by the life sciences, social sciences, and medicine. This course introduces general principles of heredity in the context of complex organisms from plants to animals and humans. Special attention will be paid to topics at the intersection of genetics, medicine, and society, such as the intersection between genetics and issues such as racism, sexism, and economic inequality. Material featured on the MCAT exam will also receive emphasis. Prerequisite: IB majors are required to take IB 204 Genetics.

IB 202 Physiology credit: 3 or 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/202/>)

How animals function in acquiring, processing, and allocating resources in the face of environmental constraints. The inquiry-based laboratory emphasizes testing of hypotheses related to functioning of physiological components of the basic systems of animals. Lecture only, 3 hours; with laboratory, 4 hours. Students must complete the laboratory portion of the course to receive 4 hours of credit. The laboratory includes vertebrate dissection. Prerequisite: IB 150 and MCB 150.

IB 203 Ecology credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/203/>)

The links between evolution and ecology, population dynamics, community structure and function, and ecosystem function on local and global scales. Basic ecology needed to understand environmental problems and to conserve biodiversity. Investigations in both field and laboratory included. Prerequisite: IB 150 and MCB 150.

This course satisfies the General Education Criteria for:  
Advanced Composition

IB 204 Genetics credit: 3 or 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/204/>)

The fundamentals of inheritance, with an emphasis on eukaryotes. Major topics include transmission genetics, quantitative genetics, cytogenetics, genomics, genetics of development and behavior, and population genetics. Laboratory emphasizes an experimental, inquiry-based approach to modern and classical genetics. Lecture only, 3 hours; with laboratory, 4 hours. Students must complete the laboratory portion of the course to receive 4 hours of credit. Prerequisite: IB 150 and MCB 150.

IB 210 The Biology of Sex: From Molecules to Societies credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/IB/210/>)

The biological study of sexual reproduction, through the survey of molecular and physiological processes and with reference to the function, ecology, behavior, and evolution of sexual and asexual reproduction in human societies and other organisms. Using student-driven library-research, and written and verbal team presentations on primary data papers, the course also explores the methods of originating, analyzing, and interpreting sex-focused scientific data.

This course satisfies the General Education Criteria for:  
Nat Sci Tech - Life Sciences

IB 220 Applied Entomology credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/IB/220/>)

Same as CPSC 270 and NRES 270. See CPSC 270.

IB 230 Pandemics credit: 2 Hours. (<https://courses.illinois.edu/schedule/terms/IB/230/>)

Pandemics (global outbreaks of infectious disease) are among the most impactful events in human history. Through this course, we will study the major historical and modern pandemics from a biological, social, and political perspective. We will compare these past events to the public health crisis caused by COVID-19 and use this knowledge to interpret events and scientific discoveries related to pandemics.

IB 270 Evolution of Molecules & Cells credit: 5 Hours. (<https://courses.illinois.edu/schedule/terms/IB/270/>)

The major evolutionary transitions of biomolecules and cells including: energy acquisition and metabolism; information inheritance, system regulation, and genomes; the origin of life and of the prokaryotic cell, eukaryotic cell, and multicellularity. Lecture and laboratory. Credit is not given for both IB 270 and IB 204. Prerequisite: IB 150 and MCB 150. Admission to the IB honors biology option; credit or concurrent registration in organic chemistry.

IB 271 Organismal Biology credit: 5 Hours. (<https://courses.illinois.edu/schedule/terms/IB/271/>)

Integrated study of the diversity and structure and function of plants and animals in evolutionary and environmental contexts. Conceptual themes and techniques of molecular and cellular levels of biological organization will be integrated as well. Lecture and laboratory. The laboratory includes vertebrate dissection. Credit is not given for both IB 271 and IB 202. Prerequisite: IB 150, MCB 150, and IB 270; good standing in the honors biology option.

This course satisfies the General Education Criteria for:  
Advanced Composition

IB 290 Introduction to Undergraduate Research in Integrative Biology credit: 2 Hours. (<https://courses.illinois.edu/schedule/terms/IB/290/>)

An introduction to the practice of scientific research through hands-on experience and direct faculty interaction. Through weekly discussions, students are exposed to a variety of research topics, methods and careers in Integrative Biology and practice the steps involved in devising, planning, executing and presenting a scientific research project. Students are also assigned to a faculty advisor and work three hours a week on a laboratory and/or field research project. Prerequisite: Restricted to IB majors only.

IB 299 Undergraduate Special Course credit: 0 to 5 Hours. (<https://courses.illinois.edu/schedule/terms/IB/299/>)

Approved for Letter and S/U grading. May be repeated in the same term; may be repeated in separate terms to a maximum of 6 hours.

IB 302 Evolution credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/302/>)

Broad introduction to evolutionary biology, including natural selection and microevolution, phylogeny, speciation, molecular evolution, macroevolution and the fossil records. The laboratory emphasizes a survey of biodiversity and processes and patterns of evolution. Prerequisite: IB 204 or consent of instructor.

IB 303 Anatomy credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/303/>)

An overview of the body structure of vertebrate animals, with a special focus on mammals including humans. Body structure will be investigated from evolutionary, developmental, and human health perspectives through lectures, in-class activities, and required laboratory dissections. Through this course, students will develop a better understanding of anatomy vocabulary, the anatomical design of vertebrates, vertebrate development, and how vertebrate anatomy and development are related to each other, to organismal function, and to human health. Prerequisite: IB 150.

IB 329 Animal Behavior credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/IB/329/>)

Introductory course emphasizing how patterns of behavior promote survival, change through evolution, and are modified by the environment. Same as ANSC 366, ANTH 342, and PSYC 329.

IB 348 Fish and Wildlife Ecology credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/IB/348/>)

Same as NRES 348. See NRES 348.

IB 360 Evolution and Human Health credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/IB/360/>)

Our health is inseparably tied to our evolutionary history. As a result, evolution is an important underpinning discipline for health professionals. This course first provides an overview of evolutionary processes, molecular evolution, human evolution, life history theory, and evolutionary-developmental biology. Second, it illustrates the application of these principles to our understanding of nutrition and metabolism, reproduction, disease and stress, and behavior. Third, it shows in practical terms how the principles of evolutionary medicine can be applied in medical practice and public health. Same as ANTH 360. Prerequisite: IB 302 or MCB 250 or MCB 244, or consent of instructor.

IB 361 Ecology and Human Health credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/IB/361/>)

Exploration of the emergence of infectious diseases and other human health issues from an ecological perspective, including vector-borne diseases, diseases spread from wildlife in terrestrial and aquatic ecosystems, and the role of pathogens and parasites in community and population ecology, food webs, and ecosystem functioning. Attention will be placed on how current and future global change and biodiversity loss will contribute to the increasing prevalence of human emerging diseases. Same as ANTH 361.

IB 362 Marine Biology credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/IB/362/>)

Study of the major marine environments on earth, the huge diversity of organisms that live in them, and the ecological and functional reasons why these organisms live where they do. Also examines the impacts of human and their activities upon the sustainability of marine resources. Designed for students with some background in biology and evolution and interest in marine biodiversity, ecology, and conservation.

IB 364 Genomics and Human Health credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/IB/364/>)

Highlights advances in understanding the human genome, by utilizing the latest techniques in bioinformatics, i.e. acquiring, analyzing, storing, and displaying the information from the entire genome and protein sequences. The course describes the theory and practices behind modern sequencing techniques and explores the genome with a particular emphasis on the use of extensive online databases and software. Students will analyze one human disorder using bioinformatics software and databases in order to update older published literature about the genomics underpinning the disorder. Prerequisite: IB 204 or consent of instructor.

IB 368 Vertebrate Natural History credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/368/>)

Introduction to the classification, life histories, adaptations, and ecology of fishes, amphibians, reptiles, birds, and mammals. Focus is on species of the Midwest region. Laboratory emphasizes identification and distribution of Illinois' vertebrate fauna. Some Saturday field trips are required. Same as NRES 368. Prerequisite: IB 203 or NRES 219 or consent of instructor.

IB 372 Ecology and Evolution credit: 5 Hours. (<https://courses.illinois.edu/schedule/terms/IB/372/>)

Integrated study of ecology, population genetics, and evolution. Conceptual themes and techniques from the molecular, cellular, and organismal levels of biology will be integrated as well. Lecture, laboratory, and field work. Credit is not given for both IB 372 and either IB 203 or IB 302. Prerequisite: IB 271; good standing in the IB honors biology option.

IB 390 Undergraduate Research Experience credit: 0 to 5 Hours. (<https://courses.illinois.edu/schedule/terms/IB/390/>)

Laboratory and/or field research and/or reading supervised by faculty members in the School of Integrative Biology. Approved for S/U grading only. May be repeated to a maximum of 10 hours. Credit is not given for more than a combined maximum of 10 hours of IB 390 or IB 490 towards graduation for IB majors. Prerequisite: Consent of instructor.

IB 392 Translating Your IB Degree Into Career Success credit: 1 Hour. (<https://courses.illinois.edu/schedule/terms/IB/392/>)

An exploration into what career options are available to students interested in biology. Students will develop the skills to stand out as an applicant and how to break into competitive fields, even in a tough or uncertain job market. The resources and connections necessary to be successful in biology will be presented, and over 20 alumni who are professionals in many biology- and health-related fields will provide insight and commentary. All assignments are real-life applications of course material, with every component meant to further career goals. Credit is not given for both IB 292 and IB 392. Prerequisite: For students pursuing biology- or health-related careers.

IB 401 Introduction to Entomology credit: 3 or 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/401/>)

Integrated studies of the principal morphological, physiological, ecological and behavioral relationships among insects. Lecture and laboratory. 3 or 4 undergraduate hours. 3 or 4 graduate hours. An insect collection will be required for 4 hours credit. Prerequisite: IB 150; or consent of instructor.

IB 405 Evolution of Traits and Genomes credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/IB/405/>)

Study of the evolution of phenotypic traits and genetics of natural populations, stressing empirical observations and experiments. Emphasis on recent theories of genotype/environmental interactions and their relationship to evolutionary processes. Offered in alternate years. 3 undergraduate hours. 3 graduate hours. Prerequisite: IB 204; or consent of instructor.

IB 407 Plant Diversity and Evolution credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/407/>)

Surveys the 500-million year evolutionary history of terrestrial plants, from the earliest spore-producing land plants to the "abominable mystery" of flowering plant evolution. Introduction to phylogenetic principles and methods for identifying, naming, and classifying plant diversity. A total evidence approach to phylogenetic systematics is presented with genetic, morphological, and paleontological data used to reconstruct the evolutionary relationships of extant and extinct taxa. Labs will focus on plant classification and identification. 4 undergraduate hours. 4 graduate hours. Credit is not given for both IB 335 and IB 407. Prerequisite: IB 100, IB 103, or IB 150, or consent of instructor. Junior, senior, or graduate standing.

IB 411 Bioinspiration credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/IB/411/>)

Focuses on how experts in biology and technological fields find inspiration in nature and use it as a model to make technological innovations and solve societal problems. In the future, our day-to-day living, health, and the environment will benefit from interdisciplinary teams using findings in basic biological research for technological innovation. Topics to be explored include human health, efficient architecture, cooperative control, robotics, swarm logic, and advanced biological materials. 3 undergraduate hours. 3 graduate hours.

IB 416 Population Genetics credit: 3 or 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/416/>)

Same as ANSC 446. See ANSC 446.

IB 420 Plant Physiology credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/IB/420/>)

General course concerned with plant functions, including water relations, mineral nutrition, metabolism, growth, and reproduction. Same as CPSC 484. 3 undergraduate hours. 3 graduate hours. Prerequisite: IB 103 or IB 150 and MCB 150; CHEM 232; or consent of instructor.

IB 421 Photosynthesis credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/IB/421/>)

Comprehensive description of photosynthesis. Topics include: the photosynthetic membranes, light absorption, electron and proton transfer, photophosphorylation, water oxidation, RUBP carboxylase/oxygenase, photorespiration, whole plant photosynthesis, gas exchange and atmospheric interactions, and impacts of global environmental change. Same as BIOP 432 and CPSC 489. 3 undergraduate hours. 3 graduate hours. Prerequisite: IB 420, MCB 354, MCB 450, BIOP 401, or equivalent; or consent of instructor.

IB 426 Env and Evol Physl of Animals credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/IB/426/>)

Physiological adaptations of invertebrate and vertebrate animals to diverse aquatic and terrestrial environments and the extreme habitats embodied therein. 3 undergraduate hours. 3 graduate hours. Prerequisite: MCB 150; IB 202; CHEM 232; or consent of instructor.

IB 430 Animal Behavior Lab credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/IB/430/>)

Inquiry-driven laboratory course in animal behavior. Students work in groups to generate hypotheses, design experiments, collect and analyze data, and write up their results. Experiments will be carried out in both the field and lab. Discussions emphasize the scientific process, including hypothesis testing, and experimental design and statistics. 3 undergraduate hours. No graduate credit. Prerequisite: IB 329. For majors only.

IB 431 Behavioral Ecology credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/IB/431/>)

In-depth examination of areas of current interest at the interface of behavior, ecology, and evolution; focuses on communication, foraging, and social behavior. 3 undergraduate hours. 3 graduate hours. Offered in alternate years. Prerequisite: IB 329; or consent of instructor.

IB 432 Genes and Behavior credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/IB/432/>)

Concepts, methods, and problems in the analysis of the relationship between genes and behavior, the complex neurobiological processes that mediate action on behavior, in appropriate ecological and evolutionary contexts. Same as ANTH 432, NEUR 432, and PSYC 432. 3 undergraduate hours. 3 graduate hours. Prerequisite: IB 150 and IB 204; or consent of instructor.

IB 433 Insect Physiology credit: 3 or 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/433/>)

In-depth examination of the principal physiological and biochemical functions of insects. Covers the history of the field of insect physiology, as well as the current status, and future directions. Connections are made between insect physiology ("how insects work") and insect genomics, insect ecology, and integrated pest management. 3 undergraduate hours. 4 graduate hours. Credit is not given toward graduation for both IB 427 and IB 433. Prerequisite: IB 202 and IB 401.

IB 435 Critical Evaluation of Herbal Remedies credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/IB/435/>)

One-third of Americans use health care products derived from natural sources, particularly plants, but also animals, and fungi. This course examines the biological activity of natural products with respect to their ecological functions and their therapeutic uses. Principles of evidence-based medicine will be reviewed and students will evaluate natural remedies through lectures, in-class activities, discussions, and analyses of scientific papers. Overall, students develop skills useful for evaluating alternative remedies and for communicating their conclusions to the general public. 3 undergraduate hours. 3 graduate hours. Prerequisite: IB 202 or IB 203 or consent of instructor.

IB 436 Evolutionary Neuroscience credit: 3 or 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/436/>)

Same as NEUR 433, PHIL 433 and PSYC 433. See PSYC 433.

IB 438 How Organisms Move credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/438/>)

Examines the interaction between biological processes and the fundamental laws of mechanics. Covers general topics, such as structural analyses of anatomy, kinematics of movement, the behavior of organisms in fluids, and the importance of scaling, as well as specific topics, such as bird flight, fluid flow in cardio-vascular systems, and high speed predation. Lab culminates in student-designed, group projects to collect novel biomechanical data to answer questions about an organism of the students' choice. 4 undergraduate hours. 4 graduate hours. Credit is not given for both IB 434 and IB 438. Prerequisite: IB 202. Junior, Senior, or Graduate standing required.

IB 439 Biogeography credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/IB/439/>)

Spatial and temporal patterns of biological diversity and the factors that govern the distribution and abundance of taxa. This course addresses two of its subfields: historical biogeography - the origin, dispersal, and extinction of taxa and biotas; and ecological biogeography - the role physical and biotic environments have played in determining taxonomic distributions. Also explores the ecological, evolutionary, climatological, and paleontological foundations for the distribution of species and biological communities. Includes a review of many of the field's classical papers, the current synthesis of biogeographic theory, and the relevance of biogeography to modern conservation goals. Offered in alternate years. Same as ANTH 436, ESE 439, GIS 436, and NRES 441. 3 undergraduate hours. 3 graduate hours. Prerequisite: IB 150 or other introductory biology course, or consent of instructor.

IB 440 Plants and Global Change credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/IB/440/>)

Same as CPSC 431 and NRES 431. See CPSC 431.

IB 442 Evolution of Infectious Disease credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/IB/442/>)

Same as MCB 435. See MCB 435.

IB 444 Insect Ecology credit: 3 or 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/444/>)

Discussion of the practical and theoretical aspects of ecology in relation to insects as individuals, populations, and communities; emphasis on the role of insects in the environment. 3 or 4 undergraduate hours. 3 or 4 graduate hours. Offered in alternate years. Lecture only, 3 hours; with laboratory, 4 hours. Prerequisite: IB 150 and MCB 150 or consent of instructor.

IB 450 Stream Ecology credit: 3 or 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/450/>)

Same as CEE 432. See CEE 432.

IB 451 Conservation Biology credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/451/>)

Synthesis of conservation biology with an emphasis on the preservation of biological diversity and its evolutionary potential. Laboratory includes an introduction to the use of modern molecular techniques in conservation biology, computer simulation modeling, and field conservation problem solving. Same as CPSC 436 and ENVS 420. 4 undergraduate hours. 4 graduate hours. Offered in alternate years. Prerequisite: IB 203 or consent of instructor.

IB 452 Ecosystem Ecology credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/IB/452/>)

Distribution and structure of ecosystems on earth; integration of multiple disciplines to gain a holistic view of ecosystem function; ecosystem concepts as they apply to understand natural and anthropogenic environmental change. Offered in alternate years. Same as ESE 452 and NRES 462. 3 undergraduate hours. 3 graduate hours. Prerequisite: CHEM 102 and CHEM 104; or consent of instructor.

IB 453 Community Ecology credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/IB/453/>)

The direct and indirect interactions among species that determine the structure and composition of plant and animal communities. Emphasis will be on the maintenance of species diversity and its consequences at both local and regional scales. Offered in alternate years. Same as NRES 452. 3 undergraduate hours. 3 graduate hours. Prerequisite: IB 203 or consent of instructor.

IB 460 Evol of Intelligent Systems credit: 0 to 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/460/>)

Investigates the evolution of cognitive specializations in neural systems across Eukaryota. Examines gross anatomy alongside a detailed examination of microstructure across the nervous system as it supports perceptual and decision-making processes. Lab time will provide students hands-on brain dissection, histology, and microscopy experience, while lecture will focus on explaining the mechanisms of cognition and the evolution of brain organization. Assignments enable the motivated student to develop professional skills and hone their scholarly interests. Same as NEUR 460. 4 undergraduate hours. 4 graduate hours. Prerequisite: IB 302 or consent of instructor. Restricted to Junior, Senior or Graduate students.

IB 461 Ornithology credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/461/>)

Structure, function, ecology, behavior, and evolution of the birds of the world; laboratory devoted to anatomy and identification; and field studies devoted to identification and behavior of birds. Independent research project and two optional weekend field trips. Same as NRES 461. 4 undergraduate hours. 4 graduate hours. Prerequisite: IB 203; or consent of instructor.

IB 462 Mammalogy credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/462/>)

Classification, distribution, structure, function, life history, evolution and identification of mammals. Lecture/discussions, laboratory and field work. The laboratory includes vertebrate dissection. Same as NRES 442. 4 undergraduate hours. 4 graduate hours. Offered in alternate years. Prerequisite: IB 202 and IB 203; or consent of instructor.

IB 463 Ichthyology credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/463/>)

Classification, anatomy, ecology, behavior, distribution, and evolution of fishes of the world. Emphasis is on morphological, ecological, and behavioral diversification of fishes in a phylogenetic context. Laboratory devoted to anatomy and identification. Same as NRES 463. 4 undergraduate hours. 4 graduate hours. Offered in alternate years. Prerequisite: IB 302; or consent of instructor.

IB 464 Herpetology credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/464/>)

Classification, diversity, structure, function, ecology, behavior and evolution of amphibians and reptiles. Laboratory devoted to anatomy and identification. Offered in alternate years. Same as NRES 464. 4 undergraduate hours. 4 graduate hours. Prerequisite: IB 302; or consent of instructor.

IB 465 Methods in Molecular Genetics and Genomics credit: 3 or 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/465/>)

Mapping genotype to phenotype is a key challenge in biological research. Understanding gene function has importance for processes ranging from how species evolve to developing new crop varieties. This class will provide practical relevance to students interested in conducting molecular and genomic analysis, with a mixture of lectures, hands-on-tutorials and discussion sections. Examples are mainly drawn from plant research the concepts and approaches are broadly applicable to areas of molecular biology and genomics. 3 undergraduate hours. 4 graduate hours. Prerequisite: IB 204 or consent of instructor.

IB 467 Principles of Systematics credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/467/>)

Comprehensive survey of the theory and methodology of systematics as they are applied today to all groups of organisms, with a practical experience in the acquisition and analysis of systematic data. 4 undergraduate hours. 4 graduate hours. Offered in alternate years. Prerequisite: IB 302 and IB 335 or IB 468; or consent of instructor.

IB 468 Insect Classification and Evol credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/468/>)

Analytical survey of the classification and evolution of the orders and principal families of insects, with practical experience in the identification of insects at these taxonomic levels; field trips required. Lecture and laboratory. 4 undergraduate hours. 4 graduate hours. Offered in alternate years. Prerequisite: IB 401 or consent of instructor.

IB 471 Fungal Diversity and Ecology credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/471/>)

An introduction to the extraordinary diversity of fungi: from symbionts of lichens to decomposers and mycorrhizas and the pathogens of plants and animals. The current classifications of the different groups of fungi will be discussed. Emphasis will be on practical skills used for fungal culturing and identification, and discussing the ecological role of fungi in communities and ecosystems. Offered in alternate years. 4 undergraduate hours. 4 graduate hours. Prerequisite: IB 150; IB 302 recommended; or consent of instructor.

IB 476 Environmental Remote Sensing credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/IB/476/>)

Same as GGIS 476. See GGIS 476.

IB 478 Advanced Plant Genetics credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/IB/478/>)

Same as CPSC 452. See CPSC 452.

IB 479 Plant Growth and Development credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/IB/479/>)

Same as CPSC 486. See CPSC 486.

IB 480 Bioinspired Design credit: 3 or 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/480/>)

Same as ME 475. See ME 475.

IB 481 Vector-borne Diseases credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/481/>)

Study of the major groups of arthropods and associated pathogens that affect the health and well-being of humans and other animals. Training will include ecology, evolutionary biology, and epidemiology of vector-borne diseases; taxonomy and identification of vector arthropods; practical skills in molecular and mathematical biology, spatial analysis and field research. Lecture will make use of technology-enhanced classroom for group-based active learning exercises to address critical challenges in vector-borne disease control. 4 undergraduate hours. 4 graduate hours. Offered in alternate years. Prerequisite: IB 361 or IB 401 or consent of instructor.

IB 482 Insect Pest Management credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/IB/482/>)

The principles underlying the control of important insect pests of agriculture and of human and animal health; emphasis on integrated pest management involving a systems approach which combines biological, cultural, and chemical suppressive factors into ecologically sound and socially and economically acceptable technology. Lecture and laboratory. Same as CPSC 479. 3 undergraduate hours. 3 graduate hours. Prerequisite: IB 150 (or equivalent) and IB 401 or consent of instructor.

IB 484 Paleoclimatology credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/484/>)

Same as GEOL 484. See GEOL 484.

IB 490 Independent Study credit: 1 to 5 Hours. (<https://courses.illinois.edu/schedule/terms/IB/490/>)

Laboratory and/or field research supervised by faculty members in the School of Integrative Biology. A written report is required. 1 to 5 undergraduate hours. No graduate credit. May be repeated. Credit is not given for more than a combined maximum of 10 hours of IB 390 or IB 490 towards graduation for IB majors. Prerequisite: Consent of instructor.

IB 491 Biological Modeling credit: 3 or 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/491/>)

Same as ANSC 449, CPSC 448, and GGIS 468. See GGIS 468.

IB 494 Theoretical Biology + Models credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/494/>)

Biologists are increasingly using mathematical and computer-based models to complement fieldwork and experimental data. These models provide a context in which to understand and answer existing questions, and also lead us to new questions and new insights. Students will encode biological mechanisms into mathematical models, develop the skills to find solutions to these models and relate them to biological data, and analyze and discuss relevant primary literature. Examples will be drawn largely from ecology and evolutionary biology. 4 undergraduate hours. 4 graduate hours. Prerequisite: MATH 220 or MATH 221; Introductory courses in Ecology and Evolution.

IB 496 Special Courses credit: 1 to 5 Hours. (<https://courses.illinois.edu/schedule/terms/IB/496/>)

Experimental and temporary courses. 1 to 5 undergraduate hours. 1 to 4 graduate hours. Approved for Letter and S/U grading. May be repeated in separate terms to a maximum of 8 hours, if topics vary. Prerequisite: Consent of instructor.

IB 497 Science Communication credit: 3 or 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/497/>)

Trains emerging scientists to communicate beyond academia. Explores the various avenues that can be used to communicate science with different audiences. Through weekly lectures, practical assignments and invited guest lecture presentations, this course builds critical skills in written and oral communication relevant to all careers as well as the art of writing and pitching opinion pieces to various media outlets for public engagement. 3 undergraduate hours. 4 graduate hours.

IB 499 Discussions in Integrative Biology credit: 1 Hour. (<https://courses.illinois.edu/schedule/terms/IB/499/>)

Seminars, discussions, research project presentations, readings, and reviews of special topics in integrative biology. 1 undergraduate hour. 1 graduate hour. Approved for S/U grading only. May be repeated if topics vary. Prerequisite: Consent of instructor.

IB 501 Programming for Genomics credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/501/>)

Students will learn to think algorithmically by constructing a biological hypothesis, and implementing code or deploying an existing code implementation, to test that hypothesis. Students will learn to use UNIX and to program in Python, using biological data sets from high-throughput sequencing projects. We will cover major genomics approaches and the algorithms that underlie them, including K-mer analysis, genome and transcriptome assembly, databases and SQL, and visualization techniques. Same as CPSC 501. 4 graduate hours. No professional credit. Prerequisite: Courses in Ecology, Evolution, and Molecular Biology, or consent of instructor.

IB 502 Biological Networks credit: 2 Hours. (<https://courses.illinois.edu/schedule/terms/IB/502/>)

This taxon-neutral course prepares students to organize, integrate and analyze complex, multi-scale data that describe biological systems. It provides training, collecting, and processing "omic"-scale data (genomics, transcriptomics and proteomics) into network models, and analyzing these models using current in silico tools to determine biological significance and function of the resulting network interactions. Students will be introduced to Gene Ontology and open source tools for data integration and visualization, including Cytoscape, Multiple Experiment Viewer and STRING. 2 graduate hours. No professional credit. Prerequisite: Graduate student status or consent of instructor. At least one upper level undergraduate course in molecular biology or its equivalent.

IB 504 Genomic Analysis of Insects credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/IB/504/>)

Comprehensive and integrated presentation of insect genomic analysis from the molecular level to that of the population; concepts are applied to certain aspects of insect population regulation. Offered in alternate years. Prerequisite: IB 204 or consent of instructor.

IB 505 Bioinformatics & Systems Biol credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/505/>)

Same as CPSC 567. See CPSC 567.

IB 506 Applied Bioinformatics credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/506/>)

Same as ANSC 542 and CPSC 569. See ANSC 542.

IB 507 Statistical Genomics credit: 3 or 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/507/>)

Same as ANSC 545 and CPSC 545. See ANSC 545.

IB 512 Plant Metabolomics credit: 2 Hours. (<https://courses.illinois.edu/schedule/terms/IB/512/>)

Plants are sessile organisms that must respond dynamically to environmental signals. Key to their response and survival is the intricate network of metabolic pathways that result in the differential accumulation of metabolites. This course will familiarize students with the fundamentals of plant metabolomics research. Metabolomics is presented in relation to plant development, nutrition, and response to stress, among other topics. Students will use online tools to analyze, organize, and visualize metabolomics data. Course goals include a critical evaluation of a current topic in plant metabolomics and how metabolomics technology can enhance their own research objectives. 2 graduate hours. No professional credit. Prerequisite: Graduate student status or consent of instructor; at least one upper level undergraduate course in biochemistry or its equivalent.

IB 513 Disc in Plant Physiology credit: 1 Hour. (<https://courses.illinois.edu/schedule/terms/IB/513/>)

Approved for letter and S/U grading. May be repeated.

IB 516 Ecosystem Biogeochemistry credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/516/>)

Same as NRES 516. See NRES 516.

IB 517 Analysis of Biological Data in R credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/517/>)

Students will review and master commonly used statistical techniques including probability distributions, power analyses, t-tests, correlations, regression, ANOVA, generalized linear models, principal components analysis, model selection, and experimental design/interpretation. Weekly discussions focus on statistical issues such as data dredging, the difference between statistical and biological significance, and the difference between correlation and causation. The laboratory involves programming in R to create publication quality graphs, analyze/simulate/interpret data, and trouble-shooting code. 4 graduate hours. No professional credit. Prerequisite: General statistics course or consent of the instructor.

IB 524 Plant Biochemistry credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/524/>)

Same as CPSC 588. See CPSC 588.

IB 526 Seminar in Entomology credit: 0 to 1 Hours. (<https://courses.illinois.edu/schedule/terms/IB/526/>)

Discussions, reviews, and appraisals of special topics in the field of entomology. 0 to 1 graduate hours. No professional credit. Approved for Letter and S/U grading. May be repeated if topics vary.

IB 531 Emerging Infectious Diseases credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/531/>)

Examines new human infectious diseases, such as Covid-19, Avian flu, West Nile virus, AIDS, and Lyme disease, that are a major threat to human health. Explores the historic links among human health, disease pathogens, and ecology, as well as the origin of each new disease and how it is regulated by specific environmental conditions. Also explores how global change and biodiversity loss will increase the possibility of future ecological epidemics and the steps needed to reduce their effects on human health. 4 graduate hours. No professional credit. Prerequisite: Restricted to OMST or Integrative Biology graduate students in master's degree programs.

IB 532 Sustainability & Global Change credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/532/>)

Examines how on-going global change affects sustainability. Explores climate change, global warming, alternative biofuels, future food security, and conservation of biodiversity, and their effects on society. Course further examines how to make better use of the Earth's natural resources with little to no damage to the ecosystem, while taking into account ever mounting demands for energy resources and climate change. 4 graduate hours. No professional credit. Prerequisite: Course restricted to OMST or Integrative Biology graduate students in master's degree programs.

IB 533 Human Genome & Bioinformatics credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/533/>)

Highlights advances in understanding the human genome, utilizing the latest techniques in bioinformatics, i.e. acquiring, analyzing, storing, and displaying the information from the entire genome and protein sequences. Explores the latest laboratory techniques, as well as the use of extensive online databases and software. Students explore the significance of sequencing the human genome, applying bioinformatics to the genome, and realizing its potential to understand human health, disease, and the place of humans in the large ecosystem. 4 graduate hours. No professional credit. Prerequisite: Restricted to OMST or Integrative Biology graduate students in master's degree programs.

IB 534 Evolution and Medicine credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/534/>)

Explores how human health is inseparably tied to our evolutionary history. Principles that apply to human health include evolutionary processes, e.g. natural selections, as well as molecular evolution, human evolution, and evolutionary-developmental biology. Explores how these principles can be applied to understand human nutrition and metabolism, reproduction, disease and stress, and behavior. These principles assist physicians, researchers, and the general public in understanding how natural selection has acted on humans over time and left us vulnerable to disease and injury. 4 graduate hours. No professional credit. Prerequisite: Restricted to OMST or Integrative Biology graduate students in master's degree programs.

IB 535 Biology and Tech Innovation credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/535/>)

Focuses on how experts in biology and technological fields use bio-inspiration to create technology innovations to solve human problems. Classic examples, such as how the observation that seeds with barbs stick to animal fur led to Velcro, are explored. Students use and expand upon their current biological knowledge to explore new ways to create biologically-based sustainable innovations. Topics to be explored include nest building as inspiration for energy-efficient architecture, plant chemistry as inspiration for green manufacturing, animal locomotion and sensing as inspiration for robots, and the advances in understanding of biological nanostructures and nanoprocesses as inspiration for nanotechnology. 4 graduate hours. No professional credit. Prerequisite: Restricted to OMST or Integrative Biology graduate students in master's degree programs.

IB 536 Evolutionary Biology credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/536/>)

Examines fundamental topics for understanding evolution, the unifying principle for all of biology. Evidence for evolution is all around us, and learning how to view life through 'evolutionary tinted' lenses greatly changes our perspective. Emphasizes the creative ways that scientists are gaining insights into how and why life evolved as it is. Provides scholarly evidence for the basis of evolution to refute non-academic arguments. 4 graduate hours. No professional credit. Prerequisite: Restricted to OMST or Integrative Biology graduate students in master's degree programs.

IB 542 Environmental Plant Physiology credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/IB/542/>)

The interaction of plants and environment at the level of the whole organism, extending to the cell and the community; emphasis on heat and mass transfer, plant and soil potentials, and effects of light on growth. Same as CPSC 538. Offered in alternate years. Prerequisite: IB 420; consent of instructor.

IB 546 Topics in Ecology & Evolution credit: 1 Hour. (<https://courses.illinois.edu/schedule/terms/IB/546/>)

Speaker seminar series featuring discussion, review and critical analysis of general concepts and specific problems in ecology and evolution. 1 graduate hour. No professional credit. Approved for Letter and S/U grading. May be repeated in same or separate semesters.

IB 590 Individual Topics credit: 2 to 12 Hours. (<https://courses.illinois.edu/schedule/terms/IB/590/>)

Individual topics in research conducted under the supervision of faculty members in the School of Integrative Biology. Designed for graduate students who would like to become more familiar with specialized fields of study prior to committing themselves to a specific area for their doctorate degree. Approved for S/U grading only. May be repeated to a maximum of 16 hours. Prerequisite: Consent of instructor.

IB 592 Career and Skill Development in Integrative Biology credit: 2 Hours. (<https://courses.illinois.edu/schedule/terms/IB/592/>)  
A successful career in the sciences requires tools and skills for communicating research, such as how to master the scientific literature and how to write scientifically as informed scientists to broad audiences. This course helps to build these skills while also developing professional skills to better compete for positions in professional school, jobs in industry, non-profit, or government. Students will also explore career options available with an IB degree. This course is designed to teach students these skills with targeted in and out of class exercises. 2 graduate hours. No professional credit. Prerequisite: Restricted to graduate students within the School of Integrative Biology. This course is mandatory for MS in IB graduate students.